7.20 Utilities and Service Systems

This section describes the environmental setting, potential impacts, and mitigation measures for utilities and service systems that may result from changes in hydrology and changes in water supply. This analysis first addresses potential impacts from changes in water quality and supply that could affect water providers and the flowrate and composition of municipal wastewater conveyed from homes to wastewater treatment facilities. The analysis considers the effects on treatment facilities, including potential need for changes in operations or upgrades to existing facilities.

This analysis also considers municipal supply, including whether and how communities that rely in whole or in part on Sacramento/Delta supply would be able to meet municipal demand using other water management actions in response to changes in supply. Some communities may already be vulnerable, particularly in dry years, if their water supply is not enough to meet demand. This is true for municipal use that relies primarily on Sacramento/Delta supply, without access or funding to develop or utilize other supplies. It is possible that lower groundwater levels also could reduce the availability and quality of groundwater on which municipal providers and private users rely, including in economically disadvantaged communities (DACs).

Chapter 8, *Economic Analysis and Other Considerations*, includes details on population projections, socioeconomic profiles, and municipal water supply costs. Agricultural water supply is evaluated in Section 7.4, *Agriculture and Forest Resources*.

Section 7.1, *Introduction, Project Description, and Approach to Environmental Analysis*, describes reasonably foreseeable methods of compliance and response actions, including actions that would require construction. These actions are analyzed for potential environmental effects in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*, and Section 7.22, *New or Modified Facilities*.

7.20.1 Environmental Checklist

XVIII. Utilities and Service Systems	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐	☐	☐
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒

XVIII. Utilities and Service Systems		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
d.	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☒	☐	☐	☐
e.	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f.	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g.	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

7.20.2 Environmental Setting

This section describes utilities and service systems to inform the impact discussion in this section and in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*; Section 7.22, *New or Modified Facilities*; and Chapter 9, *Proposed Voluntary Agreements*.

7.20.2.1 Wastewater Collection and Treatment

Municipal wastewater contains sewage, graywater (e.g., water from sinks and showers), and sometimes industrial wastewater. Wastewater requires treatment to remove pollutants prior to discharge to surface water, ocean, or land. Municipal and industrial wastewater dischargers that discharge pollutants from any point source into waters of the United States are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Some wastewater discharges to waters of the state only are exempt from federal NPDES requirements, but California law still applies. Waste discharge requirements (WDRs) regulate the discharge of municipal, industrial, commercial, and other wastes to land that will or have the potential to affect groundwater. Regulation of waste discharges is discussed in more detail in Section 7.12.1.2, *Surface Water, Environmental Setting* and Section 7.12.2.2, *Groundwater, Environmental Setting*.

Wastewater treatment methods typically involve three distinct steps. Primary wastewater treatment involves the physical removal of solids and debris that cannot be removed in the treatment process. By directing water into holding tanks, most debris either floats to the surface where it is skimmed off, or sinks to the bottom, aided by a slowly rotating arm. Secondary treatment makes use of oxidation, which can include one or several sub-processes. Aeration is a commonly used process that involves mixing wastewater with a solution of microorganisms and with oxygen pumped into holding basins. The *activated sludge* (microorganisms) consumes the waste over a period of time (from 8 to as many as 30 hours, depending on the size of the basin), before the water moves on to a secondary clarifier process in another holding tank. The secondary clarifier works in the same manner as the primary, in that remaining debris and dead organisms are suspended and removed or sink to the bottom. The resultant clarified water may be released to rivers and streams, or further treated for recycling.

Alternative secondary treatment can be accomplished with biofiltration, which involves sand filters or contact filters to remove sediment from wastewater. This is typically most effective in small-batch wastewater treatments, including septic systems. Finally, oxidation ponds including lagoons may be used, in which wastewater is processed over a period lasting from 2 to 3 weeks.

Tertiary treatment accepts secondarily treated water for additional filtration to remove tiny, suspended solids, nitrates, and phosphates, typically through a sand filter or activated carbon. The water then goes through a disinfection process to produce recycled water suitable for drinking.

Municipal wastewater collection and treatment services are provided by cities, counties, and special districts. A municipal wastewater collection system is an underground pipe or tunnel system that transports sewage from houses and commercial buildings to wastewater treatment facilities or disposal. All public agencies that own or operate a municipal wastewater collection system consisting of more than 1 mile of pipes or sewer lines that conveys wastewater to a publicly owned wastewater treatment facility must apply for coverage under the State Water Board's Sanitary Sewer Systems General Order 2022-0103-DWQ (June 5, 2023 [replacing SWRCB Order No. 2006-0003-DWQ]).

In some cases, municipalities may provide wastewater collection infrastructure and services that discharge to regional wastewater facilities owned and operated by another municipality.

In areas where sewer services are unavailable, residents and businesses use on-site wastewater treatment systems (septic systems) to dispose of waste. Some areas also include wastewater treatment plants (WWTPs) for individual nonindustrial developments such as mobile home parks, apartment complexes, and resorts. The State Water Board and regional water boards implement the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS), which was adopted in 2012 and amended in 2018. The policy authorizes subsurface disposal of domestic strength, and in limited instances high strength wastewater and establishes minimum requirements for permitting, monitoring, and operation of OWTS for protecting beneficial uses of waters of the state and preventing or correcting conditions of pollution or nuisance. The policy also conditionally waives the requirements for owners of OWTS to apply for and receive waste discharge requirements if the OWTS meets policy conditions.

WWTPs are publicly or privately owned facilities used in the treatment or reclamation of sewage or industrial waters (Wat. Code, § 13625). WWTPs are classified according to the plant's design flow capacity and wastewater treatment processes used (Cal. Code Regs., tit. 23, § 3675). Wastewater treatment processes include primary, secondary, tertiary, and advanced treatment. The level of treatment generally depends on the receiving waters (ocean, surface streams, or land) that the WWTP discharges to. The NPDES and WDR permits issued by the State and regional water boards contain specific requirements that limit the pollutants in discharges from WWTPs. The permits also require dischargers to monitor their discharge to ensure that it meets all requirements.

Some systems produce recycled water that can be used for industrial or agricultural purposes, or further treated to be made suitable for a wider range of uses. Recycled water is treated wastewater that is redistributed for beneficial use. It is generated by treating domestic wastewater to make the water suitable for a direct beneficial use that would not otherwise occur. The required level of treatment corresponds to the proposed use of the recycled water. Water recycling treatment plants are also considered WWTPs. Distribution and use of recycled water are permitted under State Water Board General Order WQ 2016-0068-DDW, Water Reclamation Requirements for Recycled Water Use. Use of recycled water is part of the state's larger strategy to develop more resilient water supplies and increase regional self-reliance. Recycled water use can help reduce local water scarcity and can be a cost-effective solution for bringing supply and demand into a better balance.

The State Water Board's California Integrated Water Quality System (CIWQS) database is a regulatory information tracking system used by the State and regional water boards for several programs, such as NPDES and WDR permitting (SWRCB 2021). The CIWQS system includes records associated with municipal wastewater treatment facilities in California. Based on a CIWQS database query, there are approximately 440 active municipal wastewater treatment facilities in the study area, including approximately 80 facilities in the Sacramento River watershed, approximately 20 facilities in the Delta eastside tributaries region, approximately 10 facilities in the Delta, approximately 40 facilities in the San Francisco Bay Area (Bay Area) region, approximately 150 facilities in the San Joaquin Valley region, approximately 50 facilities in the Central Coast region, and approximately 90 facilities in the Southern California region. In addition, various industrial wastewater treatment facilities exist in California.

The following are examples of treatment plants in the study area.

Sacramento Regional County Sanitation District (Regional SAN). Regional SAN provides sewerage service for the Cities of Sacramento, Folsom, and West Sacramento; the communities of Courtland and Walnut Grove; and the Sacramento Sewer District (including the Cities of Elk Grove, Rancho Cordova, Citrus Heights, and portions of the unincorporated areas of Sacramento County). The population served is approximately 1.48 million. The design daily average dry weather flow capacity and the permitted average dry weather flow of the Sacramento Regional Wastewater Treatment Plant (SRWTP) is 181 million gallons per day (MGD) (approximately 203 thousand acre-feet per year [TAF/yr]), which generally provides surplus capacity; during 2015, average flow was 127 MGD (approximately 142.2 TAF/yr) (SCWA 2016). SRWTP effluent is currently composed of secondary treated wastewater, and the effluent is discharged through an outfall diffuser in the Sacramento River downstream of the Freeport Bridge. During low river flows, tidal activity can cause the river in the vicinity of the outfall to flow northward, in the reverse direction, toward the City of Sacramento. When this happens, the SRWTP diverts its discharge to emergency storage basins. The SRWTP currently provides 5 MGD of treated wastewater to its water reclamation facility (WRF), where it is treated to tertiary levels before being used for irrigation of publicly owned areas of residential neighborhoods, parks, streetscapes, schools, commercial areas, and at the SWRTP.

In 2010, the state issued more stringent treatment requirements for Regional SAN to improve water quality in the Delta. While secondary treatment was sufficient to meet previous discharge permit requirements, the new, more stringent permit will require major upgrades to the existing secondary process and add an advanced tertiary level of treatment. Regional SAN is undergoing these upgrades as a major project called EchoWater.

Under EchoWater, the district is constructing facilities for biological nutrient removal (BNR) to remove nearly all of the ammonia and most of the nitrates in the wastewater; this is anticipated to result in a 99-percent reduction in ammonia discharged to the Delta. It is also adding tertiary-level filtration to better remove smaller particles and pathogens; then, enhanced disinfection will help inactivate any pathogens that may still remain after treatment (Regional SAN 2023). Construction of the EchoWater project began in 2015. It is expected to be operational by 2021–2023. The total cost is estimated to be $1.5 to $2.1 billion. When completed, it will result in cleaner discharge water to the Sacramento River and will increase the volume and quality of recycled water for use in agricultural irrigation, municipal landscape irrigation, and industrial processes (Regional SAN 2023).

Redding. The City of Redding's Clear Creek Wastewater Treatment Plant provides wastewater collection and treatment for the City of Redding, parts of Shasta County, and Redding Ranchería, discharging to the Sacramento River. The permitted average dry weather flow is 8.8 MGD (approximately 9.86 TAF/yr), somewhat lower than its dry-weather design capacity of 9.4 MGD (approximately 10.53 TAF/yr). Its average daily flow rate in 2014 was 6.9 MGD, and the maximum daily peak flow rate was 21.1 MGD (City of Redding 2023). The Clear Creek WWTP went through a major upgrade project that was completed in 2014. The upgrades more than doubled the previous maximum peak flow of the plant. The work involved repairing, rehabilitating, and replacing existing equipment; enhancing biosolids treatment and disposal; and augmenting and improving odor control measures at the plant. In addition, a number of new facilities were constructed, including a new outfall and several new buildings. The total cost of the entire project was approximately $71 million (Water Technology 2023).

Monterey. Monterey One Water (M1W), provides wastewater treatment for the Monterey Peninsula, including the City of Monterey, with a service population of 250,000 (Fischer 2018). The facility is a useful case study, as it has provided recycled water for agricultural irrigators for more than 30 years, claiming to operate "the world's largest water recycling facility designed to irrigate freshly edible crops" (Chow 2017). In 2017, M1W produced over 4 billion gallons of recycled water (12,807 acre-feet [AF]) for irrigation. Until recently, 3,800 AF per year (AF/yr) of outflows from the treatment plant went to the ocean instead of being used for irrigation (Fischer 2018). In early 2020, M1W completed a new Advanced Water Purification Facility (AWPF) to treat the remaining underutilized water at a cost of $124 million (Smith 2020). M1W received an $88 million loan from the State Revolving Fund and a $15 million grant from Proposition 1 funds (Fischer 2018). As a result, the AWPF purifies approximately 3,500 AF/yr that flows into the Pure Water Monterey Groundwater Replenishment (GWP) project.

Hyperion. The Hyperion facility is the largest of the Los Angeles Bureau of Sanitation's four wastewater treatment and reclamation plants. Although the facility is designed for a longer-term average flow of 450 MGD, the facility currently averages about 250 MGD and is capable of handling storm–related peak flow maximums of up to 800 MGD (CUWA 2017). In general, lower inflows cause waste to get stuck in Hyperion's collection systems; then, during rainstorms, debris overload its raking system, which raises nitrogen concentrations. Hyperion does not nitrify, rather it ships about 15 percent of its effluent to other partner agencies that conduct nitrification processes. Lower flows also cause an increase in hydrogen sulfide (H_2S) production, which results in increased odors. As a result of the continuous and anticipated higher levels of H_2S in the future, Hyperion increased chemical injection and recently made decisions to expand three of its seven carbon scrubbers (CUWA 2017).

7.20.2.2 Storm Water Drainage

Storm water management services, where available, are provided by cities, counties, and, in some cases, reclamation districts and county service areas. In many areas, storm drains collect and convey runoff to pumps that discharge the runoff into local creeks, sloughs, or rivers. In rural areas, storm drainage typically is conveyed by natural drainage swales, ditches, and water courses. In urban areas, formal storm water drainage systems include underground storm drainpipes, concrete-lined culverts, and detention and retention basins. Drainage systems collect and convey storm water to watercourses and detention or retention basins to prevent localized flooding. In urban areas, storm drains also convey dry-season runoff resulting from over irrigation, washing, and other activities.

The Clean Water Act prohibits certain discharges of storm water containing pollutants except in compliance with an NPDES permit. The State Water Board's NPDES storm water program regulates some storm water discharges from three potential sources: municipal separate storm sewer systems (MS4s), construction activities, and industrial activities. The Water Boards are actively involved in initiatives to improve the management of storm water as a resource.

Because storm water runoff often is contaminated, construction projects that could increase storm water runoff are required to minimize any increases in runoff. NPDES municipal storm water permits contain Post-Construction Storm Water Management Program Requirements. Permittees are required to comply with each section in the post-construction storm water program, including site design measures, source control measures, and Low Impact Development (LID) design standards. Generally, these provisions are in place to reduce project runoff, preserve water quality, and increase on-site capture and infiltration. Permittees are required to implement LID standards to reduce runoff, treat storm water, and provide baseline hydromodification management to the extent feasible. LID standards include, but are not limited to, stream setback and buffer, soil quality improvements, tree planting and preservation, porous pavement, and living roofs. The LID site layout and design measures are based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile 24-hour storm runoff event. Any remaining runoff that is not captured onsite is treated at a bioretention facility or other facilities designed to infiltrate, bio retain, and/or enhance evapotranspiration of runoff.

The Alternative Post-Construction Storm Water Management Program allows a permittee to propose alternative measures in lieu of the standard post-construction requirements for multiple benefit projects. Multiple-benefit projects include projects that may address any of the following, in addition to water quality: water supply, flood control, habitat enhancement, open space preservation, recreation, or climate change. Multiple-benefit projects may be applied at various scales, including project site, municipal, or sub-watershed level. Multiple-benefit projects may include, but are not limited to, projects developed under Watershed Improvement Plans (Wat. Code, § 16100 et seq.), Integrated Regional Water Management Plan implementation, and green infrastructure projects. Multiple benefit projects must be equally or more protective of water quality than general post-construction requirements.

Planners and service providers increasingly view storm water capture in urban areas as a source of local water supplies, which leads to greater emphasis on reducing dispersion of urban pollutants into waterways and retaining water for future reuse, either directly or through groundwater storage and recovery. This storm water capture can occur before water enters storm drains, such as by the methods described above for construction projects, or by capturing and reusing water from storm drains. For example, the Santa Monica Urban Runoff Recycling Facility (SMURRF) captures and treats urban runoff from storm drains during the dry season, primarily to reduce pollution in Santa Monica Bay, but also to augment water supply. The collected water is treated and reused, primarily for irrigation, providing approximately 4 percent of the City of Santa Monica's water use (City of Santa Monica 2020).

7.20.2.3 Drinking Water Treatment and Supply

Water service providers include cities and counties, special districts, and private utilities that range in size from those with a few service connections to those with thousands. Most water service providers obtain their water from surface water, groundwater, or a combination of the two. Desalination, groundwater storage and recovery, and recycled water also can provide water supply. Water service providers also may obtain water through water transfers. While water conservation does not generate new water, it can extend the availability of existing supplies and is considered another source of supply. The amount of water available to individual users, including service providers, is determined by entitlements such as water rights and water contract agreements; groundwater pumping limitations; and the capacity of current infrastructure required to treat, pump, and deliver water.

A *public water system* (PWS) is defined as a system for the provision of water for human consumption, through pipes or other constructed conveyances, that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days of the year (Health and Saf. Code, § 116275, subd. (h)). There are three legal distinctions between the types of public water systems: community, nontransient noncommunity, and transient. The type of water system is based on how often people consume the water.[1] In California, the Division of Drinking Water (DDW) regulates public drinking water systems. DDW implements the federal and California Safe Drinking Water Acts (SDWA) and provides regulatory oversight of public water systems to assure the delivery of safe drinking water to all Californians. All drinking water must meet maximum contaminant levels (MCL) for multiple health concern constituents that are tracked by the state and federal environmental protection agencies. DDW issues operating permits, reviews plans and specifications for new facilities, funds infrastructure improvements, evaluates projects utilizing recycled treated wastewater, and assists public water systems in drought preparation and water conservation.

In addition, hundreds of thousands of Californians get their drinking water from state small water systems (SSWS), domestic wells, or self-supplied sources (untreated surface water). Domestic wells supply water for domestic use by an individual household or up to four individual connections. SSWSs pipe water for at least 5 and up to 14 service connections and provide drinking water to fewer than 25 people on a regular basis. SSWSs, domestic wells, and other self-supplied residences are permitted by counties and not regulated by the state. Because of this, the state has lacked data about the water quality or location of these systems and wells. Senate Bill 200, which established the Safe and Affordable Drinking Water Fund in 2019, requires counties to work toward providing this data to the State Water Board. As a result, the State Water Board is beginning to develop a clearer picture about well locations and the scale of drinking water concerns for communities accessing water through these sources.

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[1] *Community water systems* (CWS) are PWSs that serve cities, towns, and other areas with at least 15 service connections or 25 year-long residents (Health & Saf. Code, § 116275, subd. (i).) Examples include water districts, cities, mutual water companies, mobile home parks, and farm labor housing.
Nontransient noncommunity water systems are PWSs that are not CWSs and regularly serve at least 25 of the same people for 6 months or more during a given year, such as a school. (Health & Saf. Code, § 116275, subd. (k).)
Transient noncommunity water systems are PWSs that are not CWSs and that provide water for a population that is transient in nature, serving 25 or more people per day for at least 60 days per year. (Health & Saf. Code, § 116275, subd. (o).) Examples include campgrounds, parks, ski resorts, roadside rest areas, gas stations, and motels.

The 2023 Division of Drinking Water Needs Assessment Report indicates that there are approximately 7,284 PWSs, comprising 2,845 community water systems (CWS) and 4,439 noncommunity water systems (SWRCB 2023a). CWSs serving 3,300 or more service connections made up about 6 percent of the total number of PWSs and provided water to about 92 percent of the population served by PWSs. Specifically, 408 CWSs with 3,300 or more service connections served a population of 38,685,422 people (SWRCB 2023a).

Water Code section 10620 requires every urban water supplier to prepare and adopt an urban water management plan (UWMP). Water Code section 10617 defines *urban water supplier* to mean a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. This provision applies only to water supplied from PWSs subject to Health and Safety Code section 116275.

Over 95 percent of Californians are served by water systems that meet drinking water standards. However, almost 1 million people are served by failing water systems and over 1 million more obtain their drinking water from at-risk public water systems or at-risk SSWSs or domestic wells (SWRCB 2023a).

The Risk Assessment for Public Water Systems assessed the ability of a PWS to continue to meet one or more key human right to water goals: (1) providing safe drinking water; (2) accessible drinking water; (3) affordable drinking water; and/or (4) maintaining a sustainable water system. Of the 3,053 PWSs assessed, after excluding 381 failing systems, the risk assessment indicated that 512 (17 percent) were At-Risk water systems, 453 (15 percent) were Potentially-at-Risk water systems, and 1,707 (56 percent) were Not-at-Risk water systems (SWRCB 2023a).

In general, water delivered to the end users from municipal drinking water wells or surface water does not exceed federal and state MCLs (see *Environmental Setting* in Section 7.12.1, *Surface Water*, and Section 7.12.2, *Groundwater*, for drinking water quality regulatory background). Municipal wells are generally deep, and water quality tends to be better in deeper aquifers. Furthermore, water quality is managed such that, if violation of drinking water standards is found at a public well, the well can be brought offline and corrective actions taken to ensure that the water meets the MCL requirement again before it is delivered to the consumers. All water supplies from surface water, such as rivers and lakes, must undergo a high level of treatment to remove sediment, pathogens, and other contaminants before being made available for consumption. PWSs are required to conduct monitoring for regulated contaminants at a specified frequency via an appropriately accredited laboratory (accreditation done by the Environmental Laboratory Accreditation Program) to ensure compliance with health standards.

Occasionally municipal water providers encounter difficulty maintaining high water quality. For example, there has been concern recently about increased harmful algal blooms in California waterways and the potential for cyanobacteria and cyanotoxins in drinking water (SWRCB 2019). In general, monitoring of the source water (typically a reservoir) is critical; if toxins are found, drawing from deeper depth, or temporarily relying on an alternative source is one form of mitigation. However, treatment of the drinking water at a water plant is another option. For example, in 2015, EBMUD, which draws water from Pardee Reservoir, was required to switch to a higher (nearer to the surface) intake valve to maintain temperature conditions for salmon. The change in diversion location caused an unpleasant taste and smell, although there was no danger to public health. In the short term, EBMUD informed customers to chill the water and use carbon filters to improve taste and smell (EBMUD 2016). EBMUD made capital improvements to add aeration and ozonation equipment to both the Sobrante and Upper San Leandro Water Treatment Plants to address the taste and smell problems (EBMUD 2023).

Private drinking water wells may have more significant water quality issues than municipal wells because they often are shallower than municipal wells and, therefore, more susceptible to surface contaminants. However, the state does not regulate the water quality of private drinking water wells and does not require private drinking water well owners to test for water quality. As such, there is no comprehensive dataset on private drinking water quality, and there is a lack of water quality data for private drinking water wells within the study area.

Water Code section 106 identifies the policy of the state that the use of water for domestic purposes is the highest use. Water Code section 106.3 identifies that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes (also known as the "human right to water"). Relevant state agencies, including the State Water Board, need to consider the human right to water when revising, adopting, or establishing policies and regulations relevant to domestic water use.

The 2023 Risk Assessment for State Small Water Systems and Domestic Wells included 1,297 SSWSs and more than 300,000 known domestic wells (SWRCB 2023a). Public well data were used as a proxy for nearby domestic wells of similar depth where reasonable (SWRCB 2023a). The assessment looked at whether a water system or well is located in areas where groundwater is threatened by (1) encroaching contaminants that are likely to lead to concentration levels that exceed safe drinking water standards; (2) water shortage risk; and/or (3) socioeconomic risk. Of the 1,297 SSWSs assessed, the report identified 245 (19 percent) At-Risk systems, 620 (48 percent) Potentially-at-Risk systems, and 432 (33 percent) Not-at-Risk systems. Of the domestic wells assessed, the report identified 105,827 (36 percent) At-Risk, 103,986 (36 percent) Potentially-at-Risk, and 81,388 (28 percent) Not-at-Risk (SWRCB 2023a). Looking specifically at water quality issues in domestic wells, of the domestic wells assessed, the report identified 99,814 (34 percent) High Risk, 15,869 (5 percent) Medium Risk, 117,028 (40 percent) Low Risk, and 58,690 (20 percent) Unknown Risk (SWRCB 2023a).

All water system types can be found in DACs and severely disadvantaged communities (SDAC). The percent of PWSs located in DAC/SDAC areas is 53.7 percent (1,639); the percent of SSWSs located in DAC/SDAC areas is 35.2 percent (457), and the percent of domestic wells located in DAC/SDAC areas is 32.5 percent (94,579) (SWRCB 2023a).

Table 7.20-1 summarizes average annual historical water deliveries data for total water supply (sum of surface water, other sources, and groundwater) during 2005 to 2015 by geographic region and sector. The data demonstrate regional differences in water supply portfolios and water uses. Some regions, such as the San Joaquin Valley, use water primarily for agricultural purposes, while other regions, such as the Bay Area, use water primarily for municipal uses. Table 7.20-2 presents the average annual historical water deliveries data for groundwater supply for 2005 to 2015. Some regions, such as the Central Coast, depend primarily on groundwater, while other regions, such as the Bay Area, depend primarily on surface water supplies. Regional water use portfolios and water uses are further described in Sections 2.8.1, *Sacramento River Watershed*, through 2.8.7, *Southern California*.

Historical water deliveries data indicate that the average total water supply to the study area was approximately 41 million acre-feet (MAF) per year during 2005 to 2015 (Table 7.20-1). Of this, approximately 8 MAF/yr, about 20 percent, is for municipal use.

Table 7.20-1. Average Annual Total Water Supply by Geographic Region and Sector (thousand acre-feet)

Geographic Region	Agriculture	Municipal	Managed Wetlands	Total
Sacramento River watershed	6,773	826	451	8,050
Delta eastside tributaries	824	154	8	986
Delta	1,185	136	48	1,368
San Francisco Bay Area	137	1,089	26	1,251
San Joaquin Valley	16,803	1,053	581	18,437
Central Coast	1,055	279	0	1,334
Southern California	4,863	4,518	68	9,449
Total	31,639	8,054	1,181	40,875

Source: Sum of values in Table 2.8-1 and Table 2.8-2, Chapter 2, *Hydrology and Water Supply*.

Table 7.20-2. Estimated Average Annual Groundwater Supply by Geographic Region and Sector, 2005–2015 (thousand acre-feet)

Geographic Region	Agriculture	Municipal	Managed Wetlands	Total
Sacramento River watershed	2,272	387	20	2,679
Delta eastside tributaries	545	53	<1	597
Delta	34	40	0	74
San Francisco Bay Area	80	184	0	264
San Joaquin Valley	9,034	823	251	10,107
Central Coast	968	196	0	1,164
Southern California	792	1,590	0	2,382
Total	13,725	3,272	271	17,268

Source: Table 2.8-2, Chapter 2, *Hydrology and Water Supply*.

Sacramento Water Allocation Model (SacWAM) results show that annual Sacramento/Delta surface water supply ranges from approximately 7.3 to 14.8 MAF depending on hydrology, with an average of about 12.0 MAF (Figure 6.4-1, Chapter 6, *Changes in Hydrology and Water Supply*). Table 7.20-3 summarizes the average annual Sacramento/Delta supply to each geographic region based on SacWAM results for the baseline condition. The table indicates that of the overall average 12.0 MAF/yr, 3.1 MAF/yr is used for municipalities.

Table 7.20-3. Simulated Average Annual Sacramento/Delta Surface Water Supply by Geographic Region and Sector (thousand acre-feet)

Geographic Region	Agriculture	Municipal	Refuge	Total
Sacramento River watershed	4,641	480	199	5,320
Delta eastside tributaries	124	81	0	205
Delta	1,136	18	0	1,154
San Francisco Bay Area	27	670	0	698
Central Coast	37	49	0	86
San Joaquin Valley	2,422	99	298	2,819
Southern California	14	1,661	0	1,675
Total	8,401	3,058	497	11,957

Source: Table 2.8-3, Chapter 2, *Hydrology and Water Supply*.

The discussion below summarizes regional and local water supply and demand information for regions in the study area.

Sacramento River Watershed

The Sacramento River watershed had a 2016 population of approximately 2.9 million people (^U.S. Census Bureau 2017) (Table 8.2-2). The Sacramento River watershed has approximately 500 CWSs. A CWS is a public water system that supplies water to the same population year-round. Over 80 percent of these CWSs are considered small and serve fewer than 3,300 people, and most small water systems serve fewer than 500 people. In contrast, medium and large water systems account for less than 20 percent of the region's drinking water systems; however, these medium and large systems deliver drinking water to over 90 percent of the region's population. (DWR 2014)

The most populous cities in the region are Sacramento, Elk Grove, and Roseville (Figure 2.8-2). The Sacramento metropolitan area is the largest metropolitan area in the region. It relies primarily on surface water supplies to meet municipal demand and is served by more than 20 water purveyors. The City of Sacramento receives approximately 80–90 percent of its total water supply from surface water sources, and the City of Folsom receives most of its water supply from Folsom Lake (DWR 2014). Several other metropolitan area purveyors in this region receive CVP water originating in the American River watershed.

Apart from the Sacramento metropolitan area, the region is highly dependent on groundwater to meet municipal water demand. Historical water deliveries data estimate that the total municipal water supply for the Sacramento River watershed during 2005 to 2015 averaged about 826 TAF per year, with close to half of this supply from groundwater (see Table 2.8-4 in Section 2.8, *Existing Water Supply*). Some areas, such as the Colusa basin planning area, rely entirely on groundwater to meet municipal water demand (DWR 2014). Groundwater levels tend to vary based on hydrologic conditions and groundwater demand and are declining in several localized areas in the Sacramento River watershed. Some areas in the Sacramento Valley basin with a high demand for groundwater supplies are experiencing somewhat persistent drawdown in groundwater levels, including areas in Glenn County, northern Sacramento County, and areas near Chico (^DSC 2011). The western portion of the Sacramento Valley generally exhibits greater groundwater overdraft and groundwater level declines compared to areas east of the Sacramento River due to differences in aquifer properties and surface water availability.

Communities that rely primarily on groundwater are located throughout the Sacramento River watershed, including areas of Glenn, Tehama, Butte, Yuba, Sacramento, and Yolo Counties. DACs that rely on groundwater are primarily in the Sacramento metropolitan area and in the eastern Yolo County rural area along the Sacramento River north of the city of Sacramento. Some of these communities rely solely on groundwater for their drinking water, while others have additional sources of supply.

Residential per capita water use in the Sacramento River watershed is higher than in more heavily urbanized regions of the state, with overall use ranging from 221 residential gallons per capita per day (R-GPCD) in 2013 to 168 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a). Some recycled water is also used in the Sacramento River watershed for landscape irrigation and other purposes. The California Water Plan reports that recycled water is used in the American River Basin Integrated Regional Water Management effort. Regional SAN reports that more than 3.4 billion gallons (about 10 TAF) of recycled water has been used for landscape irrigation in Elk Grove neighborhoods since 2003 (Regional SAN 2014). According to county-level data reported in the Municipal Wastewater Recycling Survey (SWRCB 2015), approximately 21.5 TAF of recycled water are used each year in the Sacramento River watershed.

Delta Eastside Tributaries

The 2016 population of the Delta eastside tributaries was approximately 452,000 people (^U.S. Census Bureau 2017) (Table 8.2-2). The most populous communities in this region are Stockton and Lodi (Figure 2.8-2). The City of Stockton is the largest urban water user in the Delta eastside tributaries region; its water supplies include surface water from the Delta under the City's appropriative water rights, purchases from Woodbridge Irrigation District (WID) and Stockton East Water District (SEWD), and groundwater pumped from the Eastern San Joaquin subbasin (City of Stockton 2021).

Within the Delta eastside tributaries region, many of the small communities are self-supplied by groundwater wells ;communities such as Lodi primarily rely on groundwater and use Sacramento/Delta surface water supply as a secondary water source (City of Lodi 2016). The Delta eastside tributaries region includes the Eastern San Joaquin and Cosumnes groundwater subbasins. The Eastern San Joaquin subbasin is identified by the Sustainable Groundwater Management Act (SGMA) 2019 Basin Prioritization as a high-priority subbasin, the Cosumnes subbasin is a medium-priority subbasin, and the Eastern San Joaquin subbasin is critically overdrafted (CNRA 2022) (Table 7.12.2-3, Figure 7.12.2-1a).

Residential per capita water use in the Delta eastside tributaries region is moderate relative to other areas of the state, with overall use ranging from 187 R-GPCD in 2013 to 153 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a). Calaveras County Water District uses recycled water to irrigate golf courses and plans to expand its use of recycled water to include agricultural uses and other public activities (RMC Water and Environment 2013).

Delta

The 2016 population of the Delta region was approximately 774,000 people (^U.S. Census Bureau 2017) (Table 8.2-2). Tracy has supplies that include Sacramento/Delta water, purchases of Stanislaus River water from South San Joaquin Irrigation District, and groundwater. Antioch diverts

Sacramento/Delta water from the Delta and receives water from CCWD. The other small communities in the Delta primarily divert directly from neighboring Delta channels and pump groundwater.

Groundwater levels vary seasonally in the Delta and are influenced by precipitation, drainage, soil texture, and proximity to and levels of adjoining surface waters (DWR 2015). In the central Delta, groundwater levels are shallow and close to the surface on several Delta islands as a result of land subsidence because of land reclamation and farming, which exposed previously wet anaerobic peat soils to air causing them to decompose. In areas where shallow groundwater levels encroach on crop root zones, groundwater pumping is used to drain waterlogged agricultural fields (^DSC 2011). Increased spring flows in the Sacramento and San Joaquin Rivers and their tributaries result in an increase in groundwater levels near these rivers. Groundwater levels also are influenced by the tidal elevation.

Residential per capita water use in the Delta is moderate relative to other regions of the state, with overall use ranging from 204 R-GPCD in 2013 to 161 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a). Water supplies for users in the Delta tend to exceed local demand. The area is less urbanized than adjacent regions, with relatively small municipal demand.

San Francisco Bay Area

Approximately 18 percent of Californians reside in the Bay Area, which is the second most populous region in California. The 2016 population of the Bay Area region was approximately 7.0 million people (^U.S. Census Bureau 2017) (Table 8.2-2). Water is supplied to Bay Area municipal uses by 190 water service providers, many of which purchase water from the wholesalers that develop the supply systems. Approximately 95 percent of the population is served by medium and large drinking water systems that serve more than 3,300 people. The remaining 5 percent of the population is served by small drinking water systems serving fewer than 3,300 people (DWR 2014).

The Bay Area receives its water supply from several sources, including local surface water and groundwater, multiple imported surface water sources, in-basin water transfers, recycled water, and desalination (EBMUD 2016; City of Vacaville 2016; City of Fairfield 2016, SCVWD 2016; Zone 7 2016; ^ACWD 2016). Historical water deliveries data for the 2005 to 2015 period indicate that the region's average annual water supply was approximately 987 TAF/yr, and the average annual groundwater use for this period was 264 TAF. Of the region's total water supply, historical water deliveries data indicate that approximately 905 TAF/yr was supplied for municipal uses. Sacramento/Delta water supply accounts for approximately half of the total water supply to the Bay Area, with a SacWAM annual average of 698 TAF/yr to the region, over 95 percent of which goes to municipal uses. (See Table 2.8-7 in Section 2.8, *Existing Water Supply.*)

At the south end of San Francisco Bay, Valley Water (previously, Santa Clara Valley Water District" manages the Santa Clara groundwater subbasin, identified by SGMA 2019 Basin Prioritization as a high-priority groundwater subbasin but not identified as critically overdrafted (Table 7.12.2-5; Figure 7.12.2-1a). Surface water and precipitation in the Santa Clara Valley are now used to recharge the aquifer through groundwater infiltration basins. Sacramento/Delta supplies also are used to recharge aquifers in this area. In recent decades, groundwater levels have recovered from overdraft and tend to follow the hydrologic cycle, with increasing groundwater storage and levels during wet periods and declining storage and levels during dry periods. Valley Water currently uses a groundwater recharge and conjunctive use program, where water supplied from the Sacramento/Delta and other surface water sources are used for recharge to support groundwater levels and minimize saltwater intrusion and land subsidence. Valley Water also relies on groundwater banking facilities outside the district, including the Semitropic Water Storage District (in the San Joaquin Valley region). (SCVWD 2016).

Although the median household income in each Bay Area county is well above the DAC income threshold for California, DACs exist in all Bay Area counties. The majority of these DACs are in Alameda and Contra Costa Counties (DWR 2014).

The Bay Area has a history of recycled water planning and high municipal water use efficiencies. Per capita municipal water use in the Bay Area is relatively low due to high water rates, cool climate, and small lot sizes. Water use in the Bay Area during recent years ranged from 104 R-GPCD in 2013 to 85 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a).

San Joaquin Valley

The population in the San Joaquin Valley region in 2016 was approximately 3.6 million people (^U.S. Census Bureau 2017, page ref. n/a“ (Table 8.2-2). The San Joaquin River and Tulare Lake Hydrologic Regions have approximately 793 community drinking water systems (DWR 2014). The majority (over 80 percent) of these CWSs are considered small and serve fewer than 3,300 people. Although medium and large community drinking water systems account for less than 20 percent of the region's drinking water systems, medium and large CWSs serve over 90 percent of the region's population. In the San Joaquin Valley, many rural homes maintain domestic wells, which tend to be shallower than agricultural wells (DWR 2014).

A number of communities in the region are self-supplied by local groundwater or use groundwater in combination with other water supplies. The San Joaquin Valley has a history of high groundwater use for agriculture, which has resulted in overdraft. Prior to the 1960s, groundwater discharged to streams in much of the San Joaquin River watershed; however, with increased groundwater pumping over the years, the hydraulic gradient between surface water and groundwater systems reversed in many locations such that surface water recharges the underlying aquifer (^DSC 2011). Long-term groundwater pumping has lowered groundwater levels, and most streams lose water to the underlying aquifers.

Numerous DACs exist in the San Joaquin Valley. Several of the region's most populous cities are DACs, such as Fresno, Merced, Lodi, Madera, and Tulare (DWR 2014).

Residential per capita water use in the San Joaquin Valley is high relative to other regions of the state, with overall use ranging from 187 R-GPCD in 2013 to 153 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a).

Sacramento/Delta supply is delivered to the western and southern portions of the San Joaquin Valley. In addition, Sacramento/Delta supply can affect the CVP Friant Division service area. Municipal water use accounts for 4 percent of Sacramento/Delta supply deliveries from the Delta to the San Joaquin Valley.

Central Coast

The population in the Central Coast region in 2016 was approximately 1.5 million people (^U.S. Census Bureau 2017) (Table 8.2-2).

Historical water deliveries data indicate that the region's average annual water supply was approximately 1,334 TAF/yr, of which approximately 1,055 TAF/yr was for agricultural uses and 279 TAF/yr for municipal uses (see Table 2.8-9 in Section 2.8, *Existing Water Supply*). SacWAM indicates that Sacramento/Delta water makes up about 6 percent of the total water supply in the Central Coast but accounts for approximately half of the region's surface water supply (see Table 2.8-9 in Section 2.8, *Existing Water Supply*). The Central Coast is most reliant on groundwater for its water supply. Historical water deliveries data indicate that, for the 2005–2015 period, groundwater supplies accounted for approximately 1,164 TAF/year (over 87 percent) of the region's total water use, including approximately 92 percent of the region's agricultural water use and approximately 70 percent of the region's municipal water use (Table 2.8-9). About 57 percent of the Sacramento/Delta supplies to the Central Coast are for municipal uses and the remaining 43 percent is used for agricultural uses (Table 2.8-9). The CVP conveys a large portion of the region's Sacramento/Delta supply to northern parts of the region. San Luis Obispo and Santa Barbara Counties, in the southern part of the region, primarily depend on local surface water and groundwater sources for municipal water and only recently have started using Sacramento/Delta supply via the SWP.

Historically, groundwater pumping for irrigated agriculture has resulted in seawater intrusion occurring along the coast and overdraft of inland portions of the basin. By 2014, seawater intrusion had spread approximately 8 miles inland toward the city of Salinas (Brown and Caldwell 2014). Seawater intrusion helps maintain relatively high groundwater elevations along the coast; however, overdraft of multiple aquifers north and east of Salinas since the 1970s influences groundwater flow such that the predominant groundwater flow direction along the coast is inland, and around Salinas is toward the northeast (DWR 2004). Sacramento/Delta surface supplies do not directly provide a water source to the Salinas Valley (Figure 2.8-3a).

The Central Coast region contains numerous DACs, many of them small agricultural communities that support agricultural production workers. The Central Coast has one of the highest percentages of population living in poverty (DWR 2014). Of the estimated 400 community drinking water systems in the Central Coast, more than 80 percent are small, serving fewer than 3,300 people, and most serve fewer than 500 people. Medium and large community drinking water systems account for less than 20 percent of the region's community drinking water systems but supply over 90 percent of the region's population (DWR 2014).

The majority of the DACs in the Central Coast region are in the Watsonville, Salinas, and Hollister area. Communities in this area depend on groundwater as part of their drinking water source and also receive Sacramento/Delta surface water through the CVP San Felipe Division.

Residential per capita water use in the Central Coast region is lower relative to other regions of the state, with overall use ranging from 107 R-GPCD in 2013 to 85 R-GPCD in 2018, based on an analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a).

Southern California

The Southern California region encompasses the seven southernmost counties in California: Los Angeles, Ventura, San Bernardino, Orange, Riverside, San Diego, and Imperial. Southern California is the most populous region in California and one of the state's driest regions. This disparity requires imports of large amounts of water every year to meet demands. Groundwater, local surface water, recycled water, and desalination constitute some of the municipal water supply sources for the region. Southern California includes major population centers such as the Metropolitan Los Angeles, San Diego, Santa Ana, and Santa Clara planning areas. In addition, Southern California includes inland areas, which are generally more sparsely populated and semi-arid to arid in climate. The Southern California region had approximately 22.2 million people in 2016 (^U.S. Census Bureau 2017) (Table 8.2-2). Sacramento/Delta supply is conveyed through the California Aqueduct to 13 SWP contractors. Some of these contractors act as wholesale distributors of water to other municipalities.

Southern California has more than 700 community drinking water systems. Approximately 40 percent of the region's community drinking water systems are medium or large (serving over 3,300 people) and deliver drinking water to over 95 percent of Southern California residents. Many communities in Southern California are considered disadvantaged, including communities in the densely populated South Coast as well as inland communities. (DWR 2014)

Historical water deliveries data indicate that total water supply in Southern California was approximately 9,449 TAF/yr, including approximately 4,518 TAF/yr for municipal uses (see Table 2.8-10 in Section 2.8, *Existing Water Supply*). For the same period, groundwater sources averaged approximately 2,382 TAF/yr of Southern California's total annual water supply, of which approximately 1,590 TAF/yr was for municipal uses. (Table 2.8-10). SacWAM modeling results indicate that Sacramento/Delta surface water supplies represent approximately 1,661 TAF/yr, or 18 percent, of the average annual total water supply to Southern California (Table 2.8-10).

The Southern California In includes the service area for the Metropolitan Water District of Southern California (MWD) and 12 other SWP contractors. MWD is one of the largest wholesale water providers of drinking water in the country. Its members include 26 public agencies—14 cities, 11 municipal water districts, and 1 county water authority. These entities provide retail water to 19 million people and businesses in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. The six-county service area includes 152 cities and 89 unincorporated areas in Southern California, covering 5,200 square miles (MWD 2016).

MWD imports water via the SWP, as well as from the Colorado River. During 2015, these two sources provided about 50 percent of the MWD supply; local sources provided the remainder to supplement the imported water. Contracts providing Sacramento/Delta supply to MWD total approximately 1.9 MAF/yr. To provide year-to-year SWP supply reliability, MWD has flexible storage at Lake Perris, Castaic Lake, and Diamond Valley Lake. The rest of the supplies for MWD's service area come from resources controlled or operated by local member agencies.

For some member agencies, MWD supplies almost all the water used within that agency's service area, while others obtain varying amounts of water from MWD to supplement local supplies (MWD 2016).

One of MWD's largest partner agencies is the San Diego County Water Authority (SDCWA). SDCWA provides imported water from several sources, including MWD, to San Diego County for wholesale distribution to its member agencies. SDCWA also provides desalinated water through the Lewis Carlsbad Desalination Project. Member agencies' local supplies consist of surface water, groundwater, groundwater storage and recovery, recycled water, and seawater desalination (SDCWA 2016). The SDCWA's imported water supplies consist of water purchases from MWD, water transfers, water conserved from the All-American Canal and Coachella Canal lining projects, and water transfers pursued on an as-needed basis to offset reductions in supplies from MWD. Some of SDCWA's customers rely primarily on SDCWA water with some groundwater use.

Some groundwater basins are in overdraft conditions due to decades of pumping (DWR 2014). Alluvial groundwater basins underlie 55 percent of the Southern California region, and dozens of groundwater basins are used for water supplies, some to the extent of groundwater overdraft. There are 20 adjudicated areas in the Southern California region (Table 7.12.2-1, Figure 7.12.2-2).

Groundwater storage and recovery projects in the Southern California region use imported water to reduce seawater intrusion, maintain groundwater levels, and augment the overall water supply. Sources of imported water to this region include Sacramento/Delta surface water supplies (SWP deliveries), Colorado River supplies, and Mono Lake basin and Owens Valley supplies. Groundwater basins along the coast historically have experienced seawater intrusion due to inland overdraft; however, seawater barriers consisting of injected fresh water in several basins reduce or eliminate seawater intrusion. The increased use of recycled water, desalination (both marine and saline groundwater), and blending of imported water are strategies used to manage groundwater resources in the region. The region currently uses recycled water to augment groundwater aquifers and to replace other potable sources.

Residential per capita water use in Southern California is low relative to other regions of the state, with overall use ranging from 180 R-GPCD in 2013 to 164 R-GPCD in 2018, based on analysis of data from the State Water Board's Urban Water Supplier Monthly Reports Dataset (SWRCB 2018a). Numerous water suppliers in Southern California currently rely on water use efficiency and water conservation programs, water recycling programs, groundwater desalination facilities, and seawater desalination facilities to meet a portion of their water supply needs. Water recycling has been used successfully in Southern California since the 1960s, and recycled water provides approximately 482 TAF/yr of water (4 percent of Southern California's total applied water for irrigation), primarily in the South Coast region (SWRCB 2015). Seawater desalination projects meet a small portion of the region's water demand, including the Lewis Carlsbad Desalination Plant, which opened in December 2015 (Poseidon Water 2017). More projects are in the planning stages (DWR 2014).

7.20.2.4 Solid Waste Collection and Disposal

Counties and cities are responsible for planning for collection and disposal of the solid waste produced within their boundaries. Local enforcement agencies, authorized under the California Integrated Waste Management Act, are responsible for the permitting solid waste facilities. In areas that do not have an authorized local enforcement agency, solid waste facility permitting falls under the jurisdiction of the California Department of Resources Recycling and Recovery (CalRecycle). Many municipalities enter into franchise agreements with private waste management businesses. Oversight of solid waste disposal facilities is conducted in cooperation with private collection and disposal businesses and other local and regional public agencies. Planning and operation of solid waste management facilities often are organized at the county level because some communities do not have landfill sites within their boundaries, making it necessary to haul waste to an out-of-county or out-of-city facility for disposal.

Resource recovery (e.g., recycling, composting, waste-to-energy) is implemented to comply with state waste diversion regulations, to extend the life of landfills, to reduce environmental impacts of solid waste disposal, and to reuse resources. Resource recovery activities are commonly subject to performance measures and requirements in local Integrated Waste Management Plans.

CalRecycle's Solid Waste Information System (SWIS) facility database (CalRecycle 2023) contains information on solid waste facilities, operations, and disposal sites in California. The types of facilities included in the SWIS database include landfills, transfers stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal facilities. Class I landfill facilities are authorized to accept hazardous waste and are not included in CalRecycle's SWIS database. Based on a review of SWIS database records, there are approximately 1,070 active solid waste disposal facilities in the study area (excluding Class I landfill facilities). Each of these facilities is identified as one or more of the following categories: transfer/processing facilities (approximately 670), composting facilities (approximately 350), disposal facilities (approximately 170), in-vessel digestion facilities (less than 10), and engineered municipal solid waste conversion facilities (less than 10). Over half (approximately 540) of the 1,070 active solid waste facilities are located in Southern California, which also has the largest population of the study area regions. The Central Coast, Delta eastside tributaries, and Delta regions contain the smallest numbers of active solid waste facilities in the study area regions (approximately 80, 20, and 10 facilities, respectively).

7.20.3 Impact Analysis

This section considers how and to what extent changes in hydrology and water supply could affect compliance with wastewater treatment standards and requirements, and whether construction of new or upgraded water or wastewater treatment facilities could be needed under Impacts UT-a and UT-b. The analyses are qualitative and rely on the impact analysis and conclusions contained in Section 7.12, *Hydrology and Water Quality*.

This section also focuses on the potential impacts on municipal water supply under Impact UT-d. The analysis considers the suppliers and users of water for domestic, municipal, and industrial uses, collectively called *municipal use*, as well as water users who rely primarily on groundwater, including DACs.[2] Changes in surface supply as estimated by SacWAM and as described in Chapter 6, *Changes in Hydrology and Water Supply*, coupled with water supply planning information from local water management plans, were used in the evaluation. SacWAM results are based on potential instream flow requirements in increments of 10 percent, from 35 percent unimpaired flow to 75 percent unimpaired flow (referred to as numbered flow scenarios, such as *35 scenario*, *45 scenario*). The proposed program of implementation for the proposed Plan amendments provides for a range of flow scenarios from 45 to 65, with default implementation starting at the 55 scenario. The 35 and 75 flow scenarios are presented to inform the analyses of low and high flow alternatives in Section 7.24, *Alternatives Analysis*.

This section also evaluates landfill capacity and compliance with solid waste regulations under Impact UT-f and Impact UT-g.

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[2] For the purposes of this document, a reference to *municipal use* includes domestic and industrial uses unless otherwise specified. The terms *urban* and *municipal and industrial (M&I)* are also sometimes used in this document to generally reference municipal water supplies.

Changes in hydrology associated with the proposed Plan amendments, including flow requirements and changes in reservoir operations, would not involve construction or cause changes in population or land use that would result in an increased demand for utilities or service systems.

For checklist question UT-c, changes in hydrology and water supply would not increase storm water runoff from developed areas and, therefore, would not necessitate construction of new or expanded storm water drainage facilities. New development with associated changes in land use and population growth typically leads to increased demands on utilities and service systems, which could affect providers' abilities to meet regulatory requirements or require construction to expand or build new facilities or infrastructure to meet increased supply or service demands. The proposed Plan amendments are not expected to result in significant land use changes or population growth that increases demands on utilities and service systems (see Section 7.16, *Population and Housing*). There would be no storm water drainage impact due to these mechanisms, and Impact UT-c is not further evaluated in this section.

For the same reason, changes in hydrology and supply would not generate wastewater or require a determination by a wastewater treatment provider that it has adequate capacity to serve the project (Impact UT-e). There would be no impact, and this topic is not further evaluated in this section.

Section 7.21, *Habitat Restoration and Other Ecosystem Projects*, and Section 7.22, *New or Modified Facilities,* describe and analyze potential recreation impacts from various actions that involve construction.

Impact UT-a: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board

Changes in Hydrology and Water Supply

Section 7.12.1, *Surface Water*, evaluates water quality compliance by utilities under the proposed Plan amendments and concludes that changes in hydrology and water supply could result in exceedances of treatment requirements by altering the assimilative capacity of streams and encouraging the use of other water supply sources that may be lower quality. Section 7.12.2, *Groundwater*, concludes that changes in hydrology and water supply have the potential to affect groundwater levels in some areas, with subsequent effects on groundwater quality and drinking water wells. Drinking water providers must regularly monitor water quality to ensure that drinking water standards are met. However, a change in quality of groundwater or surface water source water could result in some reduction of water quality that could affect WWTP effluent.

Reductions in Sacramento/Delta water supply for municipal use could lead to increased use of other water sources. The quality of water delivered and used by municipalities can affect WWTP processes once the water is used and discharged into the sewer. For example, a water supplier facing reduced Sacramento/Delta surface supplies could increase its use of groundwater, which in many cases is of lower quality and may contain higher concentrations of contaminants such as nitrates or salinity. The resulting increase of constituents in the influent to the WWTP could result in exceedances and require plant modification or changes in operation to meet discharge requirements. By contrast, if a supplier turns to additional local supplies of better quality than Sacramento/Delta supplies, such as Kern River water, a WWTP would not require such modification. Lower or higher quality water for municipal use could be introduced to WWTPs from other water management actions, including groundwater storage and recovery and water transfers, depending on the source of the recharge water or transfer. Drinking water providers must regularly monitor water quality to ensure that drinking water standards are met. While still meeting drinking water standards, a change in source water composition could result in some reduction of water quality that could affect WWTP effluent.

Reduced Sacramento/Delta supply to municipal use and increased indoor water conservation to respond to a potential reduction in supply could contribute to adverse impacts on WWTP processes and effluent quality. Reductions in overall wastewater flow rates could result in lower pipe velocities and longer residence times in sewer collection systems, causing less scour and more odor. The odor impact is further analyzed in Section 7.5, *Air Quality*. Reduced wastewater flow rates with constant waste production results in increased solids concentration within the sewer system, which thereby increases debris accumulation and exacerbates blockages in sewer networks. Higher rates of blockages mean higher operations and maintenance efforts and costs to clear clogged pipes; changing concentrations of waste have been linked to accelerated corrosion rates and faster rates of structural failure (CUWA 2017). In addition, more concentrated wastewater flow could lead to increased concentrations of chemical constituents such as ammonia, salinity, and constituents that affect biochemical oxygen demand in WWTP influents (^DeZellar and Maier 1980; Tran et al. 2017). These changes could result in exceedances of discharge requirements and require modification of existing WWTP processes to continue to meet requirements.

In 2019, the Public Policy Institute of California (PPIC) collected responses from wastewater agencies throughout the state on several topics, including the impacts of the 2012–2016 drought and water conservation. The PPIC's analysis of the compiled responses indicated that reduced flows to sewers had effects on the operation and maintenance of wastewater collection systems and WWTP treatment plant processes. Some respondents to the PPIC survey needed to increase collection system monitoring and solids management to reduce the risk of increased deterioration of pipelines due to the increased corrosive nature of more concentrated sewage flows. Some respondents indicated the need to increase WWTP chemical usage, aeration rates, and sludge removal rates to treat higher concentration influent. Many of these adaptations resulted in increased costs for labor, materials, and energy. The PPIC indicated that approximately one-third of the survey respondents reported at least some increase in costs for treatment, operations and maintenance, or capital improvements during the drought. The survey found that reduced sewage flows have caused wastewater agencies to plan for more frequent replacement of equipment, purchase of new equipment to move solids through the collection system more efficiently, and provision of more efficient and effective treatment processes designed to accommodate influent with higher concentrations of pollutants. (PPIC 2019)

Changes in hydrology and water supply could alter the chemical composition of the existing water supply or could encourage the use of other water supply sources, creating the potential for exceedances of discharge requirements. These impacts would be potentially significant.

Implementation of Mitigation Measure MM-UT-a will reduce or avoid exceedances of wastewater treatment requirements. A variety of funding programs provide loans and grants for capital improvements to wastewater treatment plants and projects, including the Clean Water State Revolving Fund (CWSRF). Many of the projects funded by the CWSRF program address wastewater discharge violations or enforcement orders (SWRCB 2023b). Multiple programs fund solutions to water systems to help provide safe drinking water, including the Drinking Water State Revolving Fund (DWSRF) and the Safe and Affordable Drinking Water Fund established by Senate Bill 200 (SWRCB 2023c). In addition, regulation of drinking water quality will control the quality of water that affects WWTP influent. The State Water Board's Division of Drinking Water (DDW) implements the Safe Drinking Water Act through measures such as (1) issuance of permits for public water systems and their sources and treatment to ensure compliance with drinking water standards; (2) inspection of water systems; (3) tracking of monitoring requirements of water systems to determine compliance; and (4) enforcement actions. The State and regional water boards will continue to regulate waste discharges and drinking water standards and will continue to promote and support future funding sources as appropriate. Increased coordination between water suppliers and wastewater agencies will help WWTPs become better prepared for short- and long-term changes in WWTP influent characteristics from changes to lower quality water sources, projected indoor water conservation, and other factors. Mitigation Measures MM-UT-a: 4 and 5 incorporate Mitigation Measures MM-SW-a,f and MM-GW-a,f to avoid or reduce impacts on surface water and groundwater quality that may contribute to effects on WWTPs. However, unless and until the mitigation is fully implemented and proven effective, the impacts remain potentially significant.

Other Water Management Actions

Several strategies could be implemented at the local or regional level using existing infrastructure to reduce potential impacts from reduced Sacramento/Delta surface water supplies, including groundwater storage and recovery, water transfers, water recycling, and conservation measures. (See Mitigation Measure MM-UT-d: 2.) Local conditions would determine which actions are most effective. Other response actions involving construction are discussed in Section 7.22, *New or Modified Facilities*.

Groundwater storage and recovery involves intentional recharging of groundwater basins with excess surface water or other available water sources. Water sources for groundwater recharge primarily include surface water supply during years with above-average precipitation or treated wastewater. Decentralized groundwater recharge actions also may occur with low impact development (LID) projects designed to allow storm water runoff to infiltrate into the ground. Groundwater storage and recovery could affect WWTP influent composition if the stored groundwater is of lower quality than the water it may be replacing. Groundwater recharge with good-quality excess surface water could improve the quality of water that is recovered and subsequently delivered for municipal use. Groundwater recharge with lower quality sources such as treated wastewater and storm water could reduce the quality of water that is recovered and subsequently delivered for municipal use. However, storing water in the ground may improve the quality of the water by comingling with existing groundwater, providing time for some chemicals to degrade and absorption of molecules present in the soil (e.g., salts, metals, nitrates).

Similarly, depending on the source, water transfers could affect WWTP influent composition if the source of the transfer is of lower quality. If the source of the transfer is of high quality, the transfer would improve the quality of water delivered for municipal use and subsequently not affect the need for further treatment or wastewater treatment processes once the water is used. If the source of the transfer is of lower quality, this could contribute to the concentration of constituents in the wastewater subject to waste discharge requirements.

Increased groundwater storage and recovery and water transfers could contribute to the effects associated with changes in incoming water quality at drinking water treatment plants and WWTPs. These impacts are described above along with identified mitigation measures.

Increased water recycling would not diminish the quality of inflow to WWTPs because recycled water for municipal use consists of a water reclamation facility's high-quality effluent. Recycled water that undergoes less treatment is injected into an aquifer and commingled with groundwater before its use and is used only for irrigation. This lower quality recycled water would not be expected to enter water treatment plants or WWTPs.

Indoor water conservation by urban populations could contribute to reduced discharge rates into sewers, causing a smaller volume of water to enter wastewater facilities with potential consequences for WWTPs as identified above. However, reductions in municipal water use through reductions in outdoor residential use and irrigation of large commercial, industrial, and institutional landscape areas is unlikely to affect WWTP inflow/outflow. Baseline indoor water use has been decreasing for several decades (PPIC 2016) independently from the proposed Plan amendments, and further decreases in wastewater production are expected over time as a result of recent statutory changes (SWRCB 2023d). Absent the reduced Sacramento/Delta supply for municipal use, wastewater collection systems and treatment facilities will continue to experience lower or more concentrated flows. Californians are expected to continue to use water more efficiently indoors. Based on 2017, 2018, and 2019 water use data, DWR estimated that average residential indoor water use was 51 GPCD; the statewide median was 48 GPCD. DWR projected that use would continue to fall due to passive conservation, estimating that half of California would be using 44 GPCD or less by 2030 (DWR 2021a).

Changes in WWTP influent chemical constituent composition may require adjustment of WWTP operation to avoid exceedances of discharge requirements in connection with reduced municipal supply and reduced quality of other supplies. These impacts are described above, and mitigation measures are identified.

Impact UT-b: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects

Changes in Hydrology and Water Supply

Drinking Water Treatment Plants

For drinking water facilities, Section 7.12.1, *Surface Water*, concludes that changes in hydrology and supply could affect the quality of surface water sources used for drinking water due to potential effects such as reduced dilution near water supply intakes and increased use of lower quality water supply sources. This could result in exceedances of standards and subsequent need for construction or expansion of drinking water treatment plants. Section 7.12.2, *Groundwater*, concludes that changes in hydrology and water supply under the proposed Plan amendments have the potential to affect groundwater levels in some areas, with subsequent effects on groundwater quality. Possible local changes in groundwater flow direction and decreasing groundwater levels could lead to downward or lateral movement of water contaminated with nutrients, pesticides, or other contaminants, which could affect drinking water wells. This could result in construction or expansion of drinking water treatment plants and/or a need for private domestic well owners to consolidate with municipal suppliers.

Drinking water treatment plant operators would be obligated to continue to comply with drinking water standards. Faced with a supply source that could cause MCL exceedances, operators would modify plant operations or construct additional facilities to come into compliance with requirements. Modified operations of drinking water treatment plant facilities may be needed to ensure that the water supply continues to meet drinking water standards. Operational changes could include increased chemical usage, increased mechanical harvesting, additional or expanded nitrification, additional disinfection residual and disinfectant by-product (DBP) control practices, or increased pipeline flushing. Physical upgrades can include improvements in local storage facilities such as installing baffling systems and increasing the turnover rate through deep cycling pumping and tank mixing, including pipe realignment.

These changes in operations or installation of new equipment are not likely to create environmental impacts if they simply replace or upgrade existing equipment. In some locations that are more vulnerable to reduced Sacramento/Delta supply, modification or expansion of the drinking water treatment facility or consolidation of domestic well owners with municipal water suppliers could be needed or hastened. If ground is disturbed, there could be environmental impacts. Examples of potential ground disturbance activities that could cause environmental effects include installation of additional equipment to provide additional treatment capacity, construction of pipelines to convey water from other water supply sources to the drinking water facility, and construction of pipelines to convey water to private domestic well owners who choose to consolidate with municipal suppliers. If a drinking water provider cannot maintain compliance with permit requirements, modifications or additional treatment facilities would be needed. A new or expanded drinking water treatment plant may need to be constructed. This impact would be potentially significant. This is considered and evaluated as a reasonably foreseeable response action to the proposed Plan amendments. Construction of new or modified water treatment facilities is evaluated in Section 7.22, *New or Modified Facilities*.

Wastewater Treatment Plants

As described for Impact UT-a, the quality and quantity of water entering WWTPs could be affected by changes in hydrology and supply under the proposed Plan amendments. The potential for WWTP discharges to exceed waste discharge requirements depends on site-specific conditions, including the chemical composition of the replacement water supply; the assimilative capacity of the receiving waters; types and capacities of treatment processes at the WWTP; the existing amount of redundancy and operational flexibility at the facility; and the magnitude of the change in receiving water flow, wastewater plant discharge flow, and plant effluent and receiving water chemical constituent concentrations. Modification of operations or construction of additional equipment or facilities can ameliorate some of the negative consequences.

If a WWTP is unable to modify treatment operations to accommodate increases in constituent concentrations, the WWTP operator will need to invest in upgrades earlier than expected, resulting in additional lifecycle or replacement cost. WWTPs typically are designed for certain peak influent concentration levels, or amounts of biodegradable organic material and filterable particles per unit of liquid. Smaller plants may reach peak influent concentration levels sooner than at the rated design flow if incoming constituent mass levels remain unchanged when plant inflows become reduced due to indoor water conservation. Thus, a WWTP upgrade may need to occur at influent flows that are below the WWTP's original design flow capacity (CUWA 2017).

Many wastewater agencies potentially affected by implementation of the proposed Plan amendments will be able to meet waste discharge requirements through operational changes that do not require construction and would not cause associated significant environmental impacts.

Wastewater treatment districts and agencies generally undertake construction of facility expansions, upgrades, and improvements in substantial increments in response to a variety of factors, including anticipated population growth, age and expected remaining life of existing facilities, new technology, and changing environmental and community standards. While these expansions or reconstructions would have taken place in the absence of the proposed Plan amendments, with the proposed Plan amendments, they may be needed earlier than otherwise. Many districts will require no construction to meet waste discharge requirements. In rare cases, influent changes due to implementation of the proposed Plan amendments may be the deciding factor requiring an expansion or reconstruction. A wastewater facility serving an area that is more vulnerable to reduced Sacramento/Delta supply may need to plan for additional treatment facilities if the facility's existing treatment processes and expansion options lack flexibility to handle changes in the quantity and quality of influent.

Drinking water suppliers and WWTP operators are obligated to meet treatment requirements. In order to prevent or mitigate exceedances of drinking water standards and wastewater discharge water quality objectives, the proposed Plan amendments could result in construction to modify or expand existing treatment facilities in order to avoid exceedances and come into or continue compliance with treatment requirements. Construction of new or modified treatment facilities is considered and evaluated as a reasonably foreseeable response action to the proposed Plan amendments. Construction impacts and mitigation measures are evaluated in Section 7.22, *New or Modified Facilities*, under *Drinking Water Treatment, Wastewater Treatment Plant/Water Recycling Facilities*.

Other Water Management Actions

Several strategies could be implemented at the local or regional level using existing infrastructure to reduce potential impacts from reduced Sacramento/Delta surface water supplies, including groundwater storage and recovery, water transfers, water recycling, and water conservation measures. (See Mitigation Measure MM-UT-d: 2.) As discussed above under Impact UT-a, groundwater storage and recovery and water transfers could contribute to exceedances of wastewater treatment requirements, depending on the source water. Groundwater recharge with lower quality sources or water quality degradation associated with storing water in the ground could reduce the quality of water that is recovered and subsequently delivered for municipal use. Similarly, water transfers could affect WWTP influent composition if the source of the transfer is of lower quality. Indoor water conservation could contribute to reduced discharge rates into sewers that can affect the concentration of constituents in WWTP effluent. If a WWTP cannot modify operations to maintain compliance with permit requirements, modified or additional treatment facilities would be needed.

Water recycling and treatment for potable use is currently uncommon but is likely to increase in use with technological improvements and rising demand for water, and may be used to meet the municipal shortfalls discussed for Impact UT-d below. Increased demand for recycled water could result in construction of additional treatment facilities at some WWTPs to provide the capability to recycle water where previously there was no capability or inadequate capacity.

Construction of new or modified wastewater treatment facilities is already considered and evaluated as a reasonably foreseeable response action to the proposed Plan amendments. Construction of new or modified wastewater treatment facilities, including WWTP upgrades for the purpose of water recycling is addressed in Section 7.22, *New or Modified Facilities*.

Impact UT-d: Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed

Implementation of the proposed Plan amendments is anticipated to reduce available Sacramento/Delta supplies to municipalities. The analysis in this section evaluates whether changes in water supply could affect municipal supply in a manner that would cause water suppliers to need new or expanded water entitlements. Communities regularly assess whether existing water supplies can accommodate anticipated population growth and implement plans for obtaining additional water supplies if increased water supplies are needed. As explained here and elsewhere in this Staff Report, many water users have made significant investments to diversify their water supply portfolios due to existing or potential population growth, drought, environmental needs, climate change, economic factors, energy needs, unforeseen disaster, and other reasons. Those efforts include developing local and regional supplies in the export areas, groundwater storage and recovery, surface water storage, water transfers, recycled water, and desalination, while also extending the utility of existing supplies through conservation and water use efficiency efforts.

The impact analysis provides a regional-level assessment of how a reduction in Sacramento/Delta water supplies could affect municipal deliveries, whether additional water supplies may be needed, and whether impacts could be avoided by relying on existing supplies from other sources or more intensive use of demand management measures. The analysis concludes that, although some communities appear to have reserve supply from other sources that could replace Sacramento/Delta supply reductions, other communities do not have enough reserve supplies. These communities would need to intensify demand management and/or look for other water supplies, either through accelerating existing planned acquisitions or initiating the planning process for additional water supplies. If additional water supplies need to be obtained, new or modified facilities could be needed. Construction and operation impacts from new and modified facilities and mitigation measures for those impacts are described and analyzed in Section 7.22, *New or Modified Facilities.*

Changes in Water Supply

Examination of the impacts of changes in supply on municipalities begins with consideration of the change in water supply to municipal water providers. The SacWAM hydrologic model described in Chapter 6, *Changes in Hydrology and Water Supply*, provides estimates of monthly quantities of Sacramento/Delta water delivered for agricultural, municipal, and refuge uses for the entire period of simulated hydrology. Annual municipal deliveries are estimated by SacWAM, and the output is used directly in the associated municipal water supplier analyses within the Sacramento River watershed, Delta eastside tributaries, and Delta regions. SacWAM estimates of the quantity of Sacramento/Delta supplies that is exported to the San Joaquin Valley, Bay Area, Central Coast, and Southern California regions is in aggregate form that requires additional data processing before it can be used in the municipal supply analyses. The volume of export deliveries is estimated within SacWAM based on SWP and CVP contracts. The mapping of deliveries to subareas or wholesalers within each of the affected regions relies on a separate process that also is based on the particulars of the SWP and CVP contracts to estimate delivered quantities (see Appendix A1a, *Methods for Estimating Regional Sacramento/Delta Surface Water Supply for Agricultural and Municipal Use*).

Historical water deliveries data indicate that the average water supply for municipal use in the study area was approximately 8,054 TAF/yr during 2005–2015 (Table 7.20-1). SacWAM results indicate that Sacramento/Delta supply to municipal uses in the study area average approximately 3,058 TAF per year (Table 7.20-3). Municipal suppliers in some regions rely on Sacramento/Delta supplies more heavily than others, leaving them more vulnerable to reductions in that supply. Regions most reliant on the Sacramento/Delta supply are the Sacramento River watershed (58 percent of municipal supply relies on Sacramento/Delta supplies), Delta eastside tributaries (52 percent), and Bay Area (62 percent) (Table 7.20-4).

Table 7.20-4. Annual Average Surface Water and Groundwater Sources of Municipal Supply by region, and Annual Average Sacramento/Delta Supply and Percent of Total Supply for Municipal Use (thousand acre-feet per year)

Region	Surface Water	Groundwater	Total Municipal Supply	Sacramento/ Delta Supply	Sacramento/ Delta Percent of Total Municipal Supply
Sacramento River watershed	439	387	826	480	58%
Delta eastside tributaries	102	53	155	81	52%
Delta	96	40	136	18	13%
San Francisco Bay Area	905	184	1,089	670	62%
San Joaquin Valley	231	823	1,054	99	9%
Central Coast	83	196	279	49	18%
Southern California	2,928	1,590	4,518	1,661	37%
Total			8,054	3,058	38%

Sources: Tables 2.8-4 through 2.8-10, Chapter 2, *Hydrology and Water Supply*.

As a whole, Sacramento/Delta water supply to municipal uses decreases with increasing flow requirements. Table 7.20-5 provides a summary of the baseline quantities of Sacramento/Delta delivered water to municipal water providers throughout the study area and the change from baseline by flow scenario and water year type. Average annual volume delivered is reduced for each of the scenarios compared to baseline. For example, the average reduction in the 55 scenario is 714 TAF per year, which is almost one-quarter of the average Sacramento/Delta supply for municipal uses (23 percent) but would be only a 9-percent reduction in the total municipal supply in the study area. Reductions in the Sacramento/Delta deliveries for municipal uses are the least in wet years and generally the greatest in dry and below normal years. However, the impacts on municipal suppliers can vary substantially across regions.

Table 7.20-5. Annual Sacramento/Delta Supply to Municipal Uses by Water Year Type Average, Baseline and Estimated Change from Baseline for Flow Scenario (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	1,903	-209	-346	-495	-717	-891
Dry	2,812	-318	-691	-1,051	-1,326	-1,602
Below normal	3,122	-228	-554	-966	-1,386	-1,697
Above normal	3,238	-80	-284	-774	-1,317	-1,599
Wet	3,745	-72	-168	-400	-697	-1,319
All	3,058	-179	-400	-714	-1,048	-1,419

Source: Summation of values in Tables 6.4-6, 6.4-10, 6.4-13, 6.4-16, 6.4-19, 6.4-22, and 6.4-26 in Chapter 6, *Changes in Hydrology and Water Supply*.

Reductions in Sacramento/Delta water deliveries to municipal users vary by region. SacWAM estimates for regional changes in the amount of Sacramento/Delta water supplied to municipal users in Table 7.20-6 show that changes in flow requirements could result in reductions in municipal supply to all regions. Regions that receive relatively small volumes of Sacramento/Delta supply for municipal use, such as the Delta eastside tributaries, Delta, San Joaquin Valley, and Central Coast regions show the smallest volume reductions. In the populous Bay Area and Southern California regions, reductions in municipal supply would be greater than in other regions, and the magnitude of reductions would increase with increasing flow requirements. In dry and critical years, reductions under the 55 scenario could be upward of 220 TAF/yr and 667 TAF/yr, respectively (see Section 6.4, *Changes in Surface Water Supply*, for details).

Table 7.20-6. Change from Baseline Conditions: Annual Average Sacramento/Delta Supply for Municipal Use by Region and Scenario (thousand acre-feet per year)

Region	Baseline	35	45	55	65	75
Sacramento River Watershed	480	-15	-29	-52	-83	-107
Delta Eastside Tributaries	81	-7	-11	-15	-22	-28
Delta	18	0	0	-1	-2	-4
San Francisco Bay Area	670	-60	-105	-166	-238	-295
Central Coast	49	-2	-6	-12	-17	-25
San Joaquin Valley	99	-4	-11	-22	-35	-50
Southern California	1,661	-92	-238	-446	-651	-910
Total	3,058			-714		

Source: Table 6.4-1, Chapter 6, *Changes in Hydrology and Water Supply*.

The values in Table 7.20-6 were used to obtain the percent change in annual average Sacramento/Delta supplies for municipal use compared to total Sacramento/Delta supplies, as shown in Table 7.20-7. The information in Table 7.20-7 is provided to generally indicate how much the Sacramento/Delta portion of the municipal supply to each region might be affected by the proposed Plan amendments.

Table 7.20-7. Change in Annual Average Sacramento/Delta Supply for Municipal Use by Region and Scenario, Percent of Baseline Sacramento/Delta Supply

Region	35	45	55	65	75
Sacramento River watershed	-3%	-6%	-11%	-17%	-22%
Delta eastside tributaries	-9%	-14%	-19%	-28%	-34%
Delta	0%	1%	-3%	-12%	-24%
San Francisco Bay Area	-9%	-16%	-25%	-36%	-44%
Central Coast	-4%	-12%	-24%	-35%	-50%
San Joaquin Valley	-4%	-11%	-23%	-35%	-50%
Southern California	-6%	-14%	-27%	-39%	-55%

Sources: Table 7.20-6 and Table 6.4-1.

Impacts of reduction in Sacramento/Delta supply to municipal suppliers can vary substantially across regions. As Sacramento/Delta supply presents only a portion of the municipal supply portfolios, the overall impact depends on what portion of the total municipal supply is Sacramento/Delta supply compared to other supplies. Table 7.20-8 illustrates how much the total municipal supply to each region might be affected by reduced Sacramento/Delta supply by scenario. Average reductions for the 55 scenario ranges from 1 percent in the Delta region to 15 percent in the Bay Area region.

Table 7.20-8. Change in Annual Average Sacramento/Delta Supply to Municipal Users by Region and Scenario, Percent of Total Municipal Supply

Region	35	45	55	65	75
Sacramento River Watershed	-2%	-4%	-6%	-10%	-13%
Delta Eastside Tributaries	-5%	-7%	-10%	-14%	-18%
Delta	0%	0%	-1%	-1%	-3%
San Francisco Bay Area	-6%	-10%	-15%	-22%	-27%
Central Coast	0%	-1%	-2%	-3%	-5%
San Joaquin Valley	-1%	-2%	-4%	-6%	-9%
Southern California	-2%	-5%	-10%	-14%	-20%

Sources: Table 7.20-6 and Table 7.20-4.

Effects on Communities That Rely Primarily on Groundwater

Many communities in the study area rely on groundwater as their primary source of supply, either as municipal supply or supply from private domestic wells. Although the proposed Plan amendments (45 to 65 scenarios) would not directly affect these supplies, there could be indirect effects on groundwater supply and quality as discussed in Section 7.12.2, *Groundwater*, because groundwater levels may lower as a result of increased replacement groundwater pumping and reduced incidental and managed recharge of groundwater. These effects could result in higher exposure to groundwater contaminants.

Reductions in Sacramento/Delta surface water supplies and related potential changes to groundwater resources would vary by region. Although SGMA implementation could reduce or eliminate groundwater impacts, particularly in medium- and high-priority basins, the potential remains for the proposed Plan amendments to result in depletion in groundwater supplies at the local level. Communities that rely solely on groundwater could experience impacts as they could need to obtain new municipal supply water entitlements or pay more for treating replacement supplies of lower quality. The exception is the Delta region, where impacts on groundwater levels would be unlikely, as discussed in Section 7.12.2, *Groundwater*. The costs for treatment to remove pollutants from groundwater prior to placing it in a drinking water distribution system can be considerable for both construction of facilities and operations (see Chapter 8, *Economic Analysis and Other Considerations*).

Communities that rely on groundwater for drinking water supplies in the San Joaquin Valley region face challenges from declining groundwater levels under existing conditions, with critical shortages or dry wells occurring in some areas during prolonged drought periods. The frequency and severity of these challenges likely would increase due to changes in supply. Impacts on groundwater during wet and above-normal years would be less than impacts during drier water years. SGMA implementation may address some of the supply issues faced by DACs, depending on how groundwater sustainability plans are developed and how groundwater sustainability agencies consider impacts on DAC water users from local groundwater management actions. Communities that use groundwater and locally purchased water, although not receiving Sacramento/Delta supply, could be affected by degraded groundwater quality conditions and reduced groundwater supplies that result from response to the proposed Plan amendments. These conditions could result in the need for these communities to obtain other water entitlements.

Several DACs in the Friant Division service area are wholly reliant on groundwater for their water supply. Although the Friant Division service area receives water from the San Joaquin River and the Friant Kern Canal, municipalities that rely on groundwater may be affected by the proposed Plan amendments through a domino effect. Reductions in Sacramento/Delta supply to the exchange water contractors north of the Friant Division may require Friant Division water users to provide more water to the exchange contractors, which in effect would take surface water away from the Friant Division. This reduction in surface water supplies to the Friant Division would likely reduce groundwater recharge—including in some of the prominent groundwater banks such as the Kern Water Bank. In addition, a small portion of the Friant Division serves municipalities with surface water that could be reduced under the proposed Plan amendments. This could cause the Friant Division service area to seek additional water entitlements.

DACs that rely solely on groundwater could experience impacts if they would need to obtain new municipal supply water entitlements or pay for treatment. As discussed in Section 7.12.2, *Groundwater*, DACs that rely solely on groundwater often disproportionately experience impacts on their drinking water supplies. Their groundwater wells are often shallow and thus are more susceptible to water quality issues or the risk of going dry if the groundwater level is lowered. SGMA implementation may address some of the supply issues faced by DACs, depending on how groundwater sustainability plans are developed and how groundwater sustainability agencies consider impacts on DAC water users from local groundwater management actions. While the public water systems serving DACs are still required to maintain essential resources and meet public health requirements, these systems are less likely to have the resources (e.g., infrastructure, financing) to respond adequately to water supply or water quality emergencies. The cost of redrilling wells and retrofitting groundwater pumps may be prohibitive for DACs. The costs for treatment to remove pollutants from groundwater would be considerable and would negatively affect DACs. The State Water Board will continue its commitment to the human right to water through financial assistance, technical assistance, consolidations, and other means, including for communities that may be affected by reduced groundwater supplies or groundwater quality concerns. The Safe and Affordable Drinking Water Fund will provide crucial support for operations and maintenance so once-struggling CWSs can provide a sustainable source of safe drinking water. While these efforts are expected to help reduce impacts on communities that rely on groundwater for drinking water supplies, it is not certain that these efforts always will fully mitigate impacts.

Effects on Urban Water Suppliers

Water service reliability data from 2020 UWMPs provide information about current and projected future supplies and water demand of wholesale and municipal water suppliers. This information is used to place the modeled changes in Sacramento/Delta supplies in context for the analysis of municipal use. Additional information regarding the reliability of supply and response to various levels of water supply shortage are incorporated into the impact evaluation to provide information about the relative magnitude of the Sacramento/Delta supply effect and potential responses by providers in export regions.

DWR's webpage provides aggregated data in spreadsheet form compiled from supplier's 2020 UWMPs (DWR 2023d). This analysis relies upon DWR's aggregation of the suppliers' information for UWMP Table 7-4, *Multiple Dry Years Supply and Demand Comparison*.

The data used in the water service reliability assessment are based on entries for UWMP Table 7-4, *Multiple Dry Years Supply and Demand Comparison,* which summarize projected water supply and projected demand for 5 consecutive dry years at 5-year projection increments out to at least 2040 (2045 projections are optional but recommended). The analysis uses suppliers' data for 2030 to estimate expected surplus or water shortage after 5 consecutive dry years.

In all geographic regions in the study area, the projected water supply is compared to the projected future demand as reported for the water supply reliability for 5 consecutive dry years (Appendix D, *Supplemental Municipal Supply Analysis Information*). Per Water Code Section 10635(a),the UWMP water service reliability requires combined assessment of supplier's water uses and supplies under varying hydrological and development conditions. The assessment represents projected variances that occur in both supply sources and customer use under changed conditions, which include both short-term and long-term hydrological, regulatory, and development variables. (DWR 2021b). This approach accounts for an advance planning period generally required by providers to identify response actions, such as demand management and replacement sources of water; develop contracts and/or infrastructure as necessary; and potentially obtain municipal bonds or otherwise secure funding if needed. The consideration of future demand in this analysis is also consistent with the multi-agency 2020 Water Resilience Portfolio in response to Executive Order N-10-19, including Appendix 3, *Inventory and Assessment of California Water* (CNRA et al. 2020). Appendix 3 of the water resilience portfolio contains a projection of future anticipated water needs by sector, including municipalities.

If the supply of water to urban water suppliers is reduced as a result of implementing the proposed Plan amendments, service providers could respond in a variety of ways, if necessary. The response by individual municipalities will vary depending on the extent of their reliance on Sacramento/Delta surface water relative to other sources of water, and on the balance between supplies and existing demand. For example, for municipalities with extensive supply that outpaces demand, the proposed Plan amendments would not be likely to result in an impact. Municipal water conservation and efficiency measures are among management actions all service providers could implement to meet current and future water needs. Service providers with broad portfolios may have options within existing water entitlements, such as switching to or increasing use of existing groundwater supplies, groundwater storage and recovery, water recycling, water transfers, agricultural and municipal water conservation measures, or desalination. Communities that rely solely on Sacramento/Delta supply and already have unmet demands, and communities with no other water supplies of suitable quality would need to obtain new water entitlements to satisfy demands.

One of the water-planning fundamentals required of each urban wholesale and retail water supplier is to develop an effective Water Shortage Contingency Plan (WSCP) that specifies opportunities to reduce demand and augment supplies under numerous, and even unpredictable, water shortage conditions (DWR 2021b). If and when shortage conditions arise, the WSCP allows the supplier's governing body, its staff, and the public to identify and efficiently implement pre-determined steps to manage a water shortage that may occur due to a number of reasons (e.g., population growth, drought, regulatory action constraints, climate change, catastrophic events). Certain elements of a WSCP are required by the Water Code, including specific response actions that align with standard water shortage levels corresponding to progressive ranges of up to 10-, 20-, 30-, 40-, and 50-percent shortages and greater than 50-percent shortage. Shortage response actions include locally appropriate supply augmentation actions, locally appropriate demand reduction actions to adequately respond to shortages, locally appropriate operational changes, and mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions. (DWR 2021b)

Responses to supply reductions of up to 10 percent most commonly include demand management measures, such as public outreach, incentives to expand water conservation, and measures to reduce outdoor use (DWR 2021b). Increased use of demand management measures in response to supply reductions would not be considered an impact, as these measures do not require new entitlements to augment supplies. Measures to augment supplies could include groundwater storage and recovery, water recycling, water purchases, transfers, and exchanges.

As described above, data submitted by municipal water suppliers in the 2020 UWMPs Table 7-4, *Multiple Dry Years Supply and Demand Comparison,* provide a summary of water supply reliability for 5 consecutive dry years. For the impact analysis, water supply reliability data for 2030 is used to compare projected future supply and use after 5 consecutive dry years. In the analysis, whether suppliers expect a surplus or a shortage serves as a proxy to infer whether reductions in Sacramento/Delta supply would have an impact. The tables below provide water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water supply portfolio. The tables indicate 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years. A larger list of water service reliability assessments for municipal water suppliers who receive Sacramento/Delta supply is provided in Appendix D, *Supplemental Municipal Supply Analysis Information.*

Water users could take many possible actions in response to changes in Sacramento/Delta surface water supplies. Because local responses to the proposed Plan amendments are unknown, the specific magnitude and locations of potential impacts cannot be determined. Projecting the specific ways that all municipal users may respond to reduced surface supply would require undue speculation. Therefore, this analysis is general in nature and evaluates how much reductions in Sacramento/Delta supply could reduce water supplies for municipal use. Effects during extended dry years or drought conditions are considered qualitatively and would greatly exacerbate municipal shortages for some of the municipal uses. Based on expected water service reliability for 5 consecutive dry years projections for 2030, most municipalities in the study area indicate adequate supply to meet demand even during multiple dry years. However, it is likely that at least some municipalities may need to obtain new water supplies. There would be larger effects during dry years. The analysis assumes that impacts would occur (i.e., new entitlements would be needed) if suppliers could not meet demand with a combination of reduced Sacramento/Delta supply and demand management measures.

Sacramento River Watershed

SacWAM results show that, under the 55 scenario, the proposed Plan amendments could result in a 6-percent reduction in the average regional municipal supply to the Sacramento River watershed (Table 7.20-8).

Municipal water suppliers in the Sacramento River watershed rely on groundwater, CVP and SWP contracts, local surface water, in-basin water transfers and exchanges, and to a lesser extent, recycled water. Historical water deliveries data indicate that the total annual average water supplies to the region are approximately 8,050 TAF/yr, consisting of 5,371 TAF/yr of surface water and other sources, and 2,679 TAF/yr of groundwater (see Table 2.8-4 in Section 2.8, *Existing Water Supply*). Surface water supply to the region for municipal use is estimated to be 439 TAF/yr (Table 2.8-4).

SacWAM estimates Sacramento/Delta supplies to the region to be approximately 5,320 TAF/yr, of which about 480 TAF/yr (9 percent) is for municipal use (Table 2.8-4).

A large percentage of water use in the Sacramento River watershed is by CVP settlement contractors[3] and SWP settlement contractors; as a general rule, these users receive full supply unless other users have been severely reduced. Sacramento/Delta water supply is primarily delivered to agriculture in the Sacramento River watershed, but municipal and industrial use also may be affected. Table 7.20-9 displays SacWAM-estimated reductions in Sacramento/Delta supply for municipal use in the Sacramento River watershed by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supply to municipalities could be reduced by 11 percent on average (Table 7.20-7), which represents about a 6-percent reduction in overall municipal supply to the region (Table 7.20-8).

Table 7.20-9. Sacramento/Delta Supply for Municipal Use in the Sacramento River Watershed: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	456	-59	-76	-88	-116	-126
Dry	473	-18	-46	-80	-104	-115
Below normal	482	-5	-21	-55	-92	-114
Above normal	487	-4	-12	-35	-70	-110
Wet	492	-1	-5	-18	-50	-86
All	480	-15	-29	-52	-83	-107

Source: Table 6.4-6.

Table 7.20-10 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

[3] *Settlement water* refers to municipal contracts with the U.S. Bureau of Reclamation (Reclamation) that were intended to resolve legal water rights conflicts that arose between senior pre-1914 water rights holders along the Sacramento River and Reclamation following completion of the CVP.

Table 7.20-10. Sacramento River Watershed Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
Sacramento City Of	603,209	119,911	350,200	230,289
Cal American Water Company - Sacramento District	256,325	34,565	128,439	93,874
Sacramento County Water Agency	249,454	64,771	118,270	53,499
Sacramento Suburban Water District	182,817	38,617	48,000	9,383
Roseville City Of	170,526	56,990	55,005	(1,985)
Placer County Water Agency	144,125	107,071	156,156	49,085
Vacaville City Of	109,426	19,719	25,187	5,468
Folsom City Of	98,114	22,746	32,720	9,974
Redding City Of	95,808	24,622	37,922	13,301
Davis City Of	78,659	11,470	19,856	8,386
Yuba City	75,901	16,817	23,099	6,282
West Sacramento City Of	74,570	18,119	32,478	14,359
Citrus Heights Water District	68,398	10,347	10,347	-
Woodland City Of	67,726	13,975	20,837	6,862
Lincoln City Of	61,300	15,980	15,980	-
Nevada Irrigation District	54,927	193,187	282,920	89,733
Elk Grove Water District	53,100	8,798	13,000	4,202

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). Based on expected water service reliability for 5 consecutive dry years projections for 2030 (DWR 2021b), municipalities in the Sacramento River watershed indicate adequate supply to meet demand even during multiple dry years. However, it is likely that at least some municipalities may need to obtain new water supplies. There would be larger effects during dry years.

The response by individual municipalities would vary depending on the extent of their reliance on Sacramento/Delta surface water relative to other sources of water, existing other water supplies, the ability for water transfers or exchanges, water conservation, and on the balance between supplies and existing demand. For example, for municipalities with extensive supply that outpaces demand, changes in water supply likely would not result in a need for new water entitlements (Table 7.20-10). Responses to supply reduction of up to 10 percent in the Sacramento River watershed most commonly include public outreach, incentives to expand water conservation, and measures to reduce outdoor use (DWR 2021b). Measures to augment supplies could include groundwater storage and recovery, water recycling, or water transfers and exchanges.

It is possible that groundwater pumping in addition to current amounts could occur in the Sacramento River watershed to compensate for reduced Sacramento/Delta surface water supply, particularly in areas where groundwater supplies are generally high and accessible at shallow depths.

In areas where groundwater pumping is already high and groundwater levels are declining, or in areas with limited groundwater supplies (i.e., fractured-rock aquifers) it is not expected that reductions in Sacramento/Delta surface water supplies could be compensated through additional groundwater pumping. Most groundwater subbasins that underly the Sacramento River watershed, particularly in the Sacramento Valley, are identified as high- or medium-priority subbasins pursuant to SGMA (Table 7.12.2-2, Figure 7.12.2-1a). It is likely that significant additional groundwater pumping could not occur on a regular basis to compensate for the Sacramento/Delta surface water supply reductions. However, there may be significant additional conjunctive use of groundwater and surface water in the Sacramento River watershed and increases in localized uses of groundwater where that use comports with the requirements of SGMA. Significant water transfers currently take place between users in the Sacramento River watershed, and these types of transfers are likely to continue under the proposed Plan amendments. However, the volume and composition of those transfers may change.

Delta Eastside Tributaries

SacWAM results show that under the 55 scenario, the proposed Plan amendments could result in a 10-percent reduction in the average municipal supply to the Delta eastside tributaries region (Table 7.20-8).

Historical water deliveries data indicate that the average annual total water supply to the Delta eastside tributaries is approximately 986 TAF/yr, consisting of 389 TAF/yr of surface water and other sources and 597 TAF/yr of groundwater (see Table 2.8-5 in Section 2.8, *Existing Water Supply*). Surface water supply to the region for municipal use is estimated to be 102 TAF/yr (Table 2.8-5). SacWAM estimates Sacramento/Delta supply to the region to be approximately 205 TAF/yr, of which about 81 TAF/yr is for municipal use (Table 2.8-5). Table 7.20-11 displays SacWAM-estimated reductions in Sacramento/Delta supply to municipalities in the region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supply for municipal use could be reduced by 19 percent on average (see Table 7.20-7), which represents about a 10-percent reduction in overall municipal water supply to the region (Table 7.20-8).

Table 7.20-11. Sacramento/Delta Deliveries for Municipal Use in the Delta Eastside Tributaries Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	80	-25	-29	-31	-34	-37
Dry	82	-10	-17	-22	-28	-33
Below normal	82	-3	-8	-16	-24	-29
Above normal	81	-2	-4	-10	-20	-27
Wet	80	-1	-2	-4	-12	-19
All	81	-7	-11	-15	-22	-28

Source: Based on Table 6.4-10.

Table 7.20-12 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

Table 7.20-12. Delta Eastside Tributaries Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
Stockton City Of	192,800	42,104	86,300	44,196
El Dorado Irrigation District	139,100	42,720	55,300	12,580
Lodi City Of	76,024	13,960	15,000	1,040
Calaveras County Water District	23,144	22,348	74,502	52,154
Amador Water Agency	16,709	7,001	20,042	13,041

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). Based on expected water service reliability for 5 consecutive dry years projections for 2030 (DWR 2021b), municipalities in the Delta eastside tributaries region indicate adequate supply to meet demand even during multiple dry years (Table 7.20-12). Even though results for Sacramento/Delta supply to the Delta eastside tributaries region do not show large reductions in some scenarios, this is not to indicate that all users in this region would not see reduced supply. The response by individual municipalities would vary depending on the extent of reliance on Sacramento/Delta deliveries, existing other water supplies, the ability for water transfers or exchanges, and water conservation. However, it is likely that some municipalities may need to obtain new water supplies. There would be larger effects during dry years. Implementation of the Lower San Joaquin River (LSJR)/Southern Delta update to the Bay-Delta Plan could be a further constraint on supplies for water users that receive water from the Lower San Joaquin River tributaries.

The proposed Plan amendments would have a potentially significant impact on municipal water providers in the Delta eastside tributaries region.

Delta Region

SacWAM results show that under the 55 scenario, the proposed Plan amendments could result in a 1-percent reduction in the average municipal supply to the Delta region (Table 7.20-8).

Historical water deliveries data indicate that total annual average water supply to the Delta is approximately 1,368 TAF/yr, consisting of 1,294 TAF/yr of surface water and other sources and 74 TAF/yr of groundwater (see Table 2.8-6 in Section 2.8, *Existing Water Supply*). Surface water supply to the region for municipal use is estimated to be 96 TAF/yr (Table 2.8-6). SacWAM estimates Sacramento/Delta surface water supply to the region to be approximately 1,154 TAF/yr, of which about 18 TAF (13 percent) is for municipal purposes (Table 2.8-6). Table 7.20-13 displays the SacWAM-estimated reductions in Sacramento/Delta supply to municipalities in the Delta region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supply to municipalities would be reduced by about 3 percent on average (Table 7.20-7) and represents about a 1-percent reduction in overall municipal supply to the region (Table 7.20-8).

Table 7.20-13. Sacramento/Delta Supply for Municipal Use in the Delta Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	10	0	0	-1	-2	-2
Dry	15	1	0	-2	-3	-5
Below normal	18	0	1	-1	-4	-7
Above normal	20	0	1	1	0	-6
Wet	25	0	0	0	-1	-4
All	18	0	0	-1	-2	-4

Source: Table 6.4-13.

Table 7.20-14 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

Table 7.20-14. Delta Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
Tracy City Of	120,367	25,167	25,345	178
Antioch City Of	118,560	14,620	18,683	4,063
Mountain House Community Services Distric	31,781	7,134	7,134	-

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). Surface water in this region is used primarily for agricultural purposes on Delta islands (modeled in SacWAM as Delta depletions); municipal use is inconsequential and generally would be unaffected by the proposed Plan amendments.

Water suppliers in the Delta region project sufficient supplies to meet demand during extended dry periods (Table 7.20-13). However, it is possible that some municipalities may need to obtain new water supplies. There would be larger effects during dry years. Implementation of the LSJR/Southern Delta update to the Bay-Delta Plan could be a further constraint on supplies for water users that receive water from the Lower San Joaquin River tributaries.

San Francisco Bay Area

SacWAM results show that, under the 55 scenario, the proposed Plan amendments could result in a 15 percent reduction in the average municipal supply to the Bay Area region (Table 7.20-8).

Municipal water in the Bay Area region is supplied by local and regional water districts and groundwater, but a substantial share—more than half—is derived from Sacramento/Delta supply. Historical water deliveries data indicate that total annual average water supplies to the region are approximately 1,251 TAF/yr, consisting of 987 TAF/yr of surface water and other sources and 264 TAF/yr of groundwater (Tables 2.8-1 and 2.8-2 in Section 2.8, *Existing Water Supply*). Surface water supply to the region for municipal use is estimated to be 1,089 TAF/yr (see Table 2.8-7 in

Section 2.8, *Existing Water Supply*). SacWAM estimates Sacramento/Delta supply to the region to be approximately 698 TAF/yr, of which about 670 TAF/yr (62 percent) is for municipal purposes (Table 2.8-7). Table 7.20-14 displays the SacWAM-estimated reductions in Sacramento/Delta supply to municipalities in the Bay Area region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta deliveries would be reduced by about 25 percent on average, which represents about 15 percent of overall municipal use in the region (Table 7.20-8).

Table 7.20-15. Sacramento/Delta Supply for Municipal Use in the San Francisco Bay Area Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	573	-95	-138	-183	-242	-274
Dry	655	-90	-152	-220	-286	-334
Below normal	680	-63	-120	-193	-273	-338
Above normal	680	-37	-82	-155	-237	-301
Wet	723	-25	-53	-104	-178	-248
All	670	-60	-105	-166	-238	-295

Source: Table 6.4-16.

Imported supplies are provided by several conveyances, which results in non-uniform changes in supply in the region. For example, under the 55 scenario, estimated annual average supply reductions to Bay Area communities through the Mokelumne Aqueduct to EBMUD would be reduced by 95 TAF (45 percent) on average, supply through the North Bay Aqueduct would be reduced by 2 TAF (4 percent), supply through the Putah South Canal would be reduced by about 27 TAF (62 percent), and supply through the Contra Costa Canal would not be reduced.[4] The larger reductions in the Mokelumne Aqueduct and Putah South Canal are related to the larger increases in instream flow required on Putah Creek and the Mokelumne River to meet the new proposed flow requirements.

Table 7.20-16 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

[4] These estimates do not include the City of Vacaville, which is analyzed in this section with the North Bay communities with which it shares common supplies. For the 55 scenario, a 5-TAF net reduction in imports via the Putah South Canal and North Bay Aqueduct (of 17 TAF baseline Sacramento/Delta supply) is estimated for the City of Vacaville.

Table 7.20-16. San Francisco Bay Area Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
East Bay Municipal Utility District	1,542,000	196,025	196,025	-
San Jose Water Company	1,127,593	135,875	135,875	-
Alameda County Water District	371,100	55,600	56,700	1,100
Contra Costa Water District	236,100	98,600	98,600	-
Sunnyvale City Of	174,880	20,649	26,103	5,454
San Jose City Of	168,092	26,705	24,420	(2,285)
Santa Clara City Of	142,425	25,836	33,097	7,261
Vallejo City Of	138,645	30,807	31,862	1,055
Fairfield City Of	119,980	23,468	38,272	14,804
Dublin San Ramon Services District	104,625	16,762	16,762	-
Milpitas City Of	98,100	13,733	13,411	(322)
Mountain View City Of	98,080	12,548	10,038	(2,510)
Napa City Of	94,066	15,750	16,326	576
Pleasanton City Of	91,430	19,287	19,287	-
Pittsburg City Of	89,492	12,341	11,886	(455)
Brentwood City Of	72,589	13,632	21,666	8,034

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). The response by municipalities to Sacramento/Delta supply reductions would vary depending on the extent of reliance on those deliveries, existing other water supplies, the ability for water transfers or exchanges, access to groundwater, and water conservation. The 2020 UWMP data suggest that some municipalities in the Bay Area region may not have adequate supply to meet demand in 2030 during multiple dry years (Table 7.20-16). These municipalities likely would need to obtain new water supplies to prevent dry year shortages.

Implementation of the LSJR/Southern Delta update to the Bay-Delta Plan could be a further constraint on supplies for water users that receive water from the Lower San Joaquin River tributaries. The Alameda County Water District receives some water supplies from the Tuolumne River as a member of the Bay Area Water Supply & Conservation Agency (BAWSCA), which contracts with the San Francisco Public Utilities Commission, but is also a contractor for SWP supplies from the Delta. Similarly, the Cities of Santa Clara, Mountain View, and Milpitas receive some water supplies from BAWSCA but also wholesale water supplies from Valley Water, which has contracts with both the CVP and SWP (Kennedy/Jenks Consultants 2013). For the fifth dry year in 2030, Valley Water projects demand at 325,000 TAF and supply at 365,000 TAF (a 40,000-TAF surplus).

A review of Bay Area UWMPs indicate that reliance on imported water and groundwater storage and recovery exchange agreements will continue, but future efforts among wholesale water providers will expand local storage—including both surface reservoirs and groundwater recharge and evaluation of brackish water desalination (SCVWD 2016; EBMUD 2016). However, ocean desalination and brackish desalination remain high-cost measures compared with other sources of supply, including purchased imports such as water transfers from other regions.

San Joaquin Valley

SacWAM results show that, under the 55 scenario, the proposed Plan amendments could result in a 4-percent reduction in the average municipal supply to the San Joaquin Valley region (Table 7.20-8).

The San Joaquin Valley region has many local supplies and relies heavily on groundwater. SWP and CVP supplies from the Delta to the San Joaquin Valley are mainly for agriculture (86 percent) with some for urban supplies (4 percent) (Table 6.4-1). Municipalities in the San Joaquin Valley region depend on groundwater and surface water from local storage reservoirs for their water, but some locations depend on CVP (both locally stored and imported) and SWP (imported) as major supply sources.

Historical water deliveries data indicate that the average annual total water supply to the San Joaquin Valley is approximately 18,437 TAF/yr, consisting of 8,330 TAF/yr of surface water and other sources, and 10,107 TAF/yr of groundwater (see Table 2.8-8 in Section 2.8, *Existing Water Supply*). Surface water supply to the region for municipal use represents approximately 231 TAF/yr (Table 2.8-8). SacWAM estimates Sacramento/Delta surface water supply to be approximately 2,819 TAF/yr, of which about 99 TAF/yr is for municipal use (Table 2.8-8).

Table 7.20-17 displays SacWAM-estimated reductions in Sacramento/Delta supply for municipal use in the San Joaquin Valley region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supply for municipal use could be reduced by 23 percent on average (Table 7.20-7), which represents about a 4-percent reduction in overall municipal supply to the region (Table 7.20-8).

Table 7.20-17. Sacramento/Delta Supply for Municipal Use in the San Joaquin Valley Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	46	-1	-6	-11	-19	-27
Dry	89	-11	-25	-39	-50	-61
Below normal	101	-6	-18	-34	-49	-61
Above normal	107	0	-8	-25	-48	-57
Wet	130	0	-1	-7	-17	-44
All	99	-4	-11	-22	-35	-50

Source: Table 6.4-22.

Table 7.20-18 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

Table 7.20-18. San Joaquin Valley Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
California Water Service Company Bakersfiel	314,753	64,504	64,504	-
Bakersfield City Of	193,610	46,642	46,642	-
Oildale Mutual Water Company	45,382	12,559	26,726	14,167
East Niles Community Services District	38,868	9,187	16,806	7,619
Coalinga City Of	22,671	5,254	5,110	(144)
West Kern Water District	22,542	15,703	15,703	-

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). The response by individual municipalities would vary depending on the extent of reliance on Sacramento/Delta deliveries, existing other water supplies, the ability for water transfers or exchanges, and water conservation.

Communities that rely solely on Sacramento/Delta supply and already have unmet demands may need to obtain new water entitlements to satisfy demands. However, CVP contracts prioritize municipal deliveries over irrigation in dry or critical years, and data from the 2020 UWMP indicate that, in general, municipalities in the San Joaquin Valley region should have adequate supply to meet demand in 2030, even during multiple dry years (Table 7.20-18).

Central Coast

SacWAM results show that, under the 55 scenario, the proposed Plan amendments could result in a 2-percent reduction in the average municipal supply to the Central Coast region (Table 7.20-8).

Communities in the Central Coast region are highly dependent on local sources for municipal water, with approximately 70 percent of the total municipal water use met by groundwater. Nearly 100 percent of the region's rural domestic water uses are supplied by groundwater. Only in the last two decades has Sacramento/Delta imported water been used to any extent in the Central Coast's water supply, which includes SWP deliveries for urban and agriculture uses (primarily in Santa Barbara County) and CVP deliveries for agriculture in San Benito County. As discussed in Chapter 2, *Hydrology and Water Supply*, about 43 percent (49 TAF/yr) of the Sacramento/Delta supply to the Central Coast region is for municipal uses, and the remaining 57 percent (37 TAF/yr) for agricultural uses (see Table 2.8-9 in Section 2.8, *Existing Water Supply*). Baseline supplies to this region vary greatly by year type; supplies in a critical year are on average nearly half of what they are in a wet year on average.

Historical water deliveries data indicate that the total annual average water supplies to the Central Coast region are approximately 1,334 TAF/yr, consisting of about 279 TAF/yr of surface water and other sources and 1,164 TAF/yr of groundwater (see Table 2.8-9 in Section 2.8, *Existing Water Supply*). SacWAM estimates Sacramento/Delta surface water supplies to be approximately 86 TAF/yr, of which about 18 percent or approximately 49 TAF are for municipal purposes (see Table 2.8-9). Table 7.20-19 displays the SacWAM-estimated reductions in Sacramento/Delta supply for municipal use in the Central Coast region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supply for municipal use could be reduced by about 24 percent on average, which represents about a 2-percent reduction in overall municipal supply to the region

(Table 7.20-8). Sacramento/Delta deliveries would be reduced roughly equally, with slightly higher reductions to CVP contractors than SWP contractors.

Table 7.20-19. Sacramento/Delta Supply for Municipal Use in the Central Coast Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	22	-1	-3	-6	-9	-13
Dry	44	-5	-13	-20	-25	-30
Below normal	50	-3	-10	-18	-25	-30
Above normal	53	0	-4	-13	-24	-28
Wet	65	0	0	-4	-8	-22
All	49	-2	-6	-12	-17	-25

Source: Table 6.4-19.

Table 7.20-20 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

Table 7.20-20. Central Coast Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
Santa Maria City Of	122,402	17,247	25,396	8,149
Santa Barbara City Of	102,033	11,680	13,900	2,220
Goleta Water District	86,787	12,118	12,118	-
San Luis Obispo City Of	53,924	7,713	10,537	2,824
Hollister City Of	37,365	7,334	7,334	-
Golden State Water Company - Orcutt	35,959	7,039	7,039	-
Sunnyslope County Water District	23,704	7,334	7,334	-
Nipomo Community Service District	17,042	3,369	4,013	644
Carpinteria Valley Water District	16,716	3,691	3,691	-
Grover Beach City Of	14,536	1,464	1,624	160
Montecito Water District	12,250	5,333	4,817	(516)
Morro Bay City Of	11,525	1,366	1,720	354
Pismo Beach City Of	9,060	1,924	2,471	547

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). Based on expected water service reliability for 5 consecutive dry years projections for 2030 (2020 UWMP Table 7-4), municipalities in the Central Coast region indicate adequate supply to meet demand even during multiple dry years (Table 7.20-20). The response by individual municipalities would vary depending on the extent of reliance on Sacramento/Delta deliveries, existing other water supplies, the ability for water transfers or exchanges, and water conservation. However, it is likely that some municipalities may need to obtain new water supplies. There would be larger effects during dry years.

Southern California

SacWAM results show that, under the 55 scenario, the proposed Plan amendments could result in a 10-percent reduction in the average municipal supply to the Southern California region (Table 7.20-8).

The Southern California regional water supply portfolio includes imported supplies from several sources, including Sacramento/Delta supply delivered through the SWP, local surface water supplies and groundwater, some recycled and desalinated water supplies, and imported supplies from the Colorado River and the Owens Valley/Mono Basin in the Eastern Sierra. Water conservation and water use efficiency practices have been emphasized in the South Coast portion of the Southern California region. For inland southern California municipalities, Sacramento/Delta supply contributes a small fraction of their overall municipal supply (SBVMWD 2016). Other water supplies represent the majority of the municipal supply to these agencies, including local groundwater and groundwater storage and recovery. As discussed in Chapter 2, *Hydrology and Water Supply*, SWP water supplied to Southern California from the Sacramento/Delta is nearly all for municipal uses with a small amount for agricultural irrigation purposes.

Historical water deliveries data indicate that, of the estimated 9.4 MAF of total annual average water supplies used in the Southern California region, municipalities use about 4.5 MAF (or 4,518 TAF). SacWAM estimates that Sacramento/Delta surface water supply to the region is approximately 1,675 TAF/yr, of which about 1,661 TAF/yr is for municipal use (see Table 2.8-10 in Section 2.8, *Existing Water Supply*). As municipal use is the largest use of Sacramento/Delta supply in the region, the reductions in Sacramento/Delta supply to this region are representative of the estimated reductions in municipal supply that could occur under the various scenarios. Table 7.20-21 displays the SacWAM-estimated reductions in Sacramento/Delta supplies for municipal use in the Southern California region by flow scenario and water year type. Under the 55 scenario, Sacramento/Delta supplies for municipal use would be reduced by 27 percent on average (Table 7.20-7), which represents about a 10-percent reduction in overall municipal supply to the region (Table 7.20-8).

Table 7.20-21. Sacramento/Delta Supply for Municipal Use in the Southern California Region: Change from Baseline (thousand acre-feet per year)

Water Year Type	Baseline	35	45	55	65	75
Critical	715	-28	-94	-176	-295	-413
Dry	1,452	-184	-440	-667	-830	-1,025
Below normal	1,709	-149	-379	-649	-917	-1,117
Above normal	1,809	-37	-174	-536	-919	-1,070
Wet	2,230	-45	-106	-263	-430	-895
All	1,661	-92	-238	-446	-651	-910

Source: Table 6.4-26.

Table 7.20-22 provides water service reliability assessments for a sample of municipal suppliers that rely on Sacramento/Delta supply as a part of their water portfolio. The table shows 2030 projected population, annual demand and supply (AF), and expected surplus (positive values, blue bars) or shortage (negative values, red bars) after 5 consecutive dry years.

Table 7.20-22. Southern California Region Water Service Reliability Assessment for Municipal Suppliers That Rely on Sacramento/Delta Supply as a Part of Water Portolio

Water Supplier Name	Population Served	Estimated Demand	Estimated Supply	Expected Surplus or Shortage
Los Angeles City Department Of Water And P	4,374,240	673,600	673,600	-
San Diego City Of	1,531,174	202,843	202,843	-
Eastern Municipal Water District	695,500	150,800	150,800	-
Long Beach City Of	517,822	51,861	84,752	32,891
Irvine Ranch Water District	454,165	94,687	176,679	81,992
Anaheim City Of	388,045	63,326	65,949	2,623
Santa Clarita Valley Water Agency	349,596	85,910	118,490	32,580
Santa Ana City Of	347,511	36,459	36,459	-
Riverside City Of	333,652	97,803	121,893	24,090
Coachella Valley Water District	315,202	144,982	144,982	-
Helix Water District	282,644	40,130	47,376	7,246
Golden State Water Company - Southwest	281,025	30,446	30,446	-
Ontario City Of	266,339	52,820	52,820	-
San Gabriel Valley Water Company Fontana	253,789	37,580	37,580	-
Otay Water District	239,627	44,200	44,200	-
Los Angeles County Waterworks District 40 -	227,000	58,002	58,002	-
Cucamonga Valley Water District	225,483	47,407	50,707	3,300
San Bernardino City Of	223,806	47,803	54,974	7,171
Oxnard City Of	219,220	28,350	28,350	-
Sweetwater Authority	214,059	23,523	23,523	-
Glendale City Of	206,908	25,973	13,026	(12,947)
Huntington Beach City Of	206,499	28,115	28,115	-
Elsinore Valley Municipal Water District	190,310	41,994	49,983	7,989
Santa Margarita Water District	185,430	39,963	49,963	10,000
Wholesale Water Supplier Name				
Metropolitan Water District	20,634,000	1,570,000	2,219,000	649,000
San Diego County Water Authority	3,536,336	476,261	639,802	163,541

Source: Appendix D, *Supplemental Municipal Supply Analysis Information*.

Generally, a reduction in municipal supply of up to 10 percent would be managed through more intensive use of demand management measures (DWR 2021b). The response by individual municipalities would vary depending on the extent of reliance on Sacramento/Delta deliveries, existing other entitlements/water supplies, the ability for water transfers or exchanges, and water conservation. Based on expected water service reliability for 5 consecutive dry years, projections for 2030 (2020 UWMP Table 7-4), the majority of municipalities in the Southern California region will have adequate supply to meet demand in 2030, even during multiple dry years (Table 7.20-22). Demand management is anticipated to play a large role in closing the gap if supplies diminish. However, it is likely that some municipalities may need to obtain new water supplies. There would be larger effects during dry years.

MWD's total supply (per its UWMP) is greater than the total amount it provides to member agencies. Implementation of the proposed Plan amendments could reduce Sacramento/Delta supply to MWD by about 326.2 TAF/yr on average under the 55 scenario (17 percent of the approximately 1.9 MAF/yr in contracts providing Sacramento/Delta supply to MWD). Because MWD manages a large portfolio of reserve supplies and storage, this would not affect MWD's ability to meet municipal demand in most years. MWD's ability to meet demand during drought periods could become less reliable under the proposed Plan amendments, as the actual availability of MWD's total supply depends on several factors, including the volume in storage at a given time and its Sacramento/Delta supply, which depends on Sacramento River watershed hydrology and reservoir carryover storage. The Colorado River contributes a portion of Southern California's water supply. Changes in federal requirements could cause reductions in Colorado River supply to Southern California and could increase the need for some municipalities to obtain new supplies.

In adjudicated basins that rely on Sacramento/Delta supply for replenishment, additional surface water may be needed to balance the groundwater basins.

Reduced Sacramento/Delta supply could affect responses to water shortage conditions in areas where excess Sacramento/Delta supply is used for water banking.

Groundwater storage and recovery projects that capture storm water runoff to replenish groundwater supplies are a growing activity in this region. This is because many parts of the Southern California region experience monsoonal rains in the mountains surrounding the metropolitan areas, which results in runoff that rushes down the mountains into the lower valleys that can cause flooding. Many areas have taken steps to capture runoff for recharging groundwater basins while reducing flood risk. In areas where storm water runoff is not being captured, there could be localized lowering of groundwater levels, which may affect municipal use.

Other Water Management Actions

Several strategies could be implemented at the local or regional level using existing infrastructure to reduce the potential impacts from reduced Sacramento/Delta surface water supplies, including increases in groundwater storage and recovery, water transfers, water recycling, and water conservation measures. The degree to which other water management actions are available in a particular region can reduce the need for additional entitlements in response to supply reductions. Projections regarding future water supplies indicate that some urban water suppliers are already planning for increased use of other water management actions.

Urban water suppliers generally implement other water management actions in increments in response to a variety of factors, including anticipated population growth, age and expected remaining life of existing facilities, new technology, and changing environmental and community standards. Planning activities, such as UWMPs, help water suppliers identify which factors may apply and approximate implementation dates. Generally, increased implementation of other water management actions would have taken place in the absence of the proposed Plan amendments; with the proposed Plan amendments, they may happen earlier than otherwise.

Statewide policies that encourage more efficient use of water are in place and are being implemented. The *Water Resilience Portfolio* (CNRA et al. 2020) details actions to help California move toward improved regional water resilience, including reduced reliance on the Delta, simplification of the water transfer approval process, increased recycled water use, and greater efficiency of water use.

Reducing reliance on the Delta is state policy, along with an associated mandate for improving regional self-reliance (Wat. Code, § 85021). DWR's guidance for preparing 2020 UWMPs encourages urban water suppliers to include information demonstrating progress toward reduced reliance on water supplies from the Delta (DWR 2021b).

Water transfers to benefit urban use are common and act to contribute to existing entitlements and lessen the impacts on municipal use. The Water Code and the common law's "no injury" rule prevents transfers of water that would cause injury to other legal users of water. Legal users of water include those possessing riparian/overlying and perfected appropriative rights. The "no injury" rule generally does not consider impacts on third-party beneficiaries, such as effects on local agricultural economies. However, if a transfer involves wheeling of water through a state or local water conveyance system, Water Code section 1810 prohibits the use of such facilities if the transfer would unreasonably affect the overall economy or the environment of the county from which the water is being transferred. CEQA requires that a public agency consider the reasonably foreseeable direct and indirect environmental consequences of transfers when a public agency is involved in the transfer, such as in the case of a change order from the State Water Board. (SWRCB 2002).

Transfers approved by the State Water Board and conveyed by facilities operated by DWR and/or Reclamation generally require environmental review and approval by different agencies that would be expected to analyze and address environmental impacts. DWR and Reclamation periodically update a technical white paper that explains the process for obtaining approval to use SWP or CVP facilities for water transfers.

Water recycling is anticipated to increase due to the State Water Board goal to increase the use of recycled water in California from 714,000 AF in 2015 to 1.5 MAF by 2020 and to 2.5 MAF by 2030 (SWRCB 2018b).

Water conservation is another important strategy for matching supply to demand. Measurable decreases in water demand can be achieved through water conservation and water use efficiency efforts. The Water Conservation Act of 2009 (SB X7-7) (Wat. Code, §§ 20608 et seq.) mandates a 20-percent reduction in per capita water use statewide by 2020. Between 2000 and 2013, average statewide per capita water use decreased from 199 to 164 GPCD (DRW et al. 2017). Between 2013 and 2015, emergency conservation regulations and tremendous drought responses by local agencies and their customers resulted in average statewide water use dropping from 164 to 129 GPCD, a 21-percent savings in 2 years (SWRCB 2023d). Since then, California has experienced some rebound, peaking at 137 GPCD in 2020 (the beginning of the hot, dry conditions associated with the 2020–2022 drought) and again dropping by the end of 2022, averaging 130 GPCD (SWRCB 2023d). Absent additional regulation, average statewide total urban water use is forecasted to decline from an average o" 130 GPCD in 2022 to 117 GPCD in 2035.

The use of other water management actions can reduce the magnitude of impacts associated with changes in Sacramento/Delta surface water supply (described above) but also could result in environmental impacts that must be evaluated. In general, other water management actions would be beneficial for municipal use, except for actions that may further reduce groundwater levels that could further exacerbate municipal use that relies on groundwater. For example, water transfers based on groundwater substitution, and conservation measures that reduce runoff and associated recharge could further reduce groundwater levels and associated water quality that could affect municipal uses. Impacts from increased use of other water management actions by urban water suppliers also are described in Section 7.12, *Hydrology and Water Quality*. Other response actions involving construction are discussed in Section 7.22, *New or Modified Facilities*.

Conclusion

The regional assessments discussed above indicate that many municipal suppliers are well prepared to address supply reductions of up to 10 percent. However, agencies that rely solely or almost solely on Sacramento/Delta water and have limited water supply portfolios, and agencies that already have demand that outpaces supply could experience impacts with reductions in the Sacramento/Delta supply. Consecutive dry years and drought periods could further stress these agencies and affect even providers with multiple sources of supply and reserves. Moreover, for some entities, notably in DACs, acquisition or development of new supplies may be fiscally infeasible. Water users—households—in these places may be subject to water shortages and high-cost transported water. These impacts would be potentially significant. Given the overwhelming importance of municipal water, agencies—on their own or in concert with others—may develop new supply through additional groundwater wells, water recycling, desalination, groundwater storage and recovery, and/or surface storage projects; these are the types of projects that this Staff Report considers to be likely responses to the Plan amendments. Predicting the precise combination of strategies that various agencies will use is beyond the scope of this analysis. Each of these water supply strategies potentially will have environmental impacts. The individual resource-area analyses in Chapter 7, *Environmental Analysis*, along with Section 7.22, *Modified or New Facilities*, discuss those impacts and make conclusions about whether they would be potentially significant.

The State Water Board is committed to the human right to water and to exercising its authority to ensure supplies for all users. Mitigation Measures MM-UT-d: 1 through 6 can avoid or reduce impacts on municipal supplies that could occur as a result of the proposed Plan amendments. The proposed program of implementation promotes voluntary implementation plans that could amplify the ecological benefit of new and existing flows with physical habitat restoration and other complementary ecosystem measures. Voluntary implementation plans also may reduce the volume of water that needs to be dedicated for instream purposes, resulting in less water supply reductions for municipal use. In addition, water users can and should diversify their water supply portfolios to the extent possible, in an environmentally responsible manner and in accordance with the law. This diversification includes sustainable conjunctive use of groundwater and surface water, water transfers, water conservation and efficiency upgrades, and increased use of recycled water.

Municipal water users are already implementing efficiency and conservation measures and are likely to implement additional efficiency and conservation measures on their own initiative in response to reduced supply. For example, as required by the 2018 Water Conservation Legislation, each urban wholesale and retail water supplier is to develop an effective WSCP that specifies opportunities to reduce demand and augment supplies under numerous, and even unpredictable, water shortage conditions. In addition, the proposed program of implementation includes a municipal shortage policy to ensure that minimum health and safety needs are met. The State Water Board will continue to work with municipal suppliers to develop and implement programs to increase water use efficiency and conservation to maximize the beneficial use of Sacramento/Delta supply, including through conditions on discretionary approvals for funding and other approvals as appropriate. Implementation of groundwater mitigation will reduce municipal impacts associated with lower groundwater levels. Additional mitigation measures may provide assistance to communities with limited supplies or impaired quality. These programs may not reach every community and may not be sufficient to resolve all flawed systems. Accordingly, the State Water Board cannot guarantee that measures will always be adopted or applied to fully mitigate potential impacts. Therefore, unless and until the mitigation is fully implemented, the impacts remain potentially significant.

Changes in Hydrology

Stream and Reservoir Elevation at Diversions

Changes in flows associated with new instream flow and cold water habitat requirements could affect the ability of existing diversion points to access water in streams where the flow requirements apply. Although instream flows generally would be maintained or would increase compared with the baseline condition, it is possible that, at some times in some streams, water levels could be lowered to the extent that existing diversion structures would be affected and could not access water. This is particularly true on regulated tributaries during summer in drier years at the higher end (65 scenario) of the proposed flow requirements because flows on regulated streams are generally stored during winter and spring and released in summer and fall for water supply purposes. Under the baseline condition, flows can be higher during summer and fall than the flow levels that would be required under the proposed Plan amendments (45 to 65 scenarios).

Higher flows in winter and spring and higher storage levels in drier conditions could result in less water available for release for water supply purposes in summer and fall. This shift could reduce flow levels below existing diversion points. This is especially true if water users in a watershed are not coordinating their diversions and if many diverters begin diversion activities at the same time, as is common during heat spells, flood-up operations, or other conditions leading to increased water use. As a result, diverters would need to coordinate their diversions within streams to ensure that water is available for their collective diversions, as well as to ensure that those diversions comply with applicable narrative and numeric instream flow and cold water habitat requirements. In the absence of coordination among diverters, water levels could remain below diversion intakes, resulting in inadequate access to water supply for municipalities. It is not possible to predict how long this lack of coordination and associated diminished water supply could continue. Therefore, it is possible that reduced effectiveness of diversion intake operations could result in reduced availability of municipal supply.

In addition to coordination among diverters, some diversion points may require physical modifications to maintain diversions where flows may be reduced during low-flow, high-demand periods. Specifically, diverters may need to extend diversion works into the channel, change from gravity diversion works to powered diversion works, make other types of modifications, or cease diversions at times. Downstream of these areas, until new diversion works are operable, surface water supply could be reduced. Small modification of diversion works would have similar impacts as those described under small construction activities.

In addition, reservoir elevation changes could affect diversions in areas that receive Sacramento/Delta supplies, such as San Luis Reservoir. There, diversions to the San Felipe Unit become constrained when the total reservoir storage drops below 500,000 AF. Under the proposed Plan amendments (45 to 65 scenarios), storage levels would drop below this threshold more frequently in all modeled flow scenarios except in the 55 scenario. If the elevation of San Luis Reservoir were to frequently drop below the intake, modifications would be required to ensure a consistent supply to users. Impacts associated with larger construction projects are evaluated in Section 7.22, *New or Modified Facilities*.

In the absence of coordination among diverters and, potentially, modifications to diversion intakes at some locations, reduced water volumes in streams during low-flow conditions could bring water levels below intakes, limiting diversions and potentially affecting the amount of water available for municipal supply during some high-demand, low-flow periods. This impact would be potentially significant. Mitigation Measure MM-UT-d: 7 identifies actions to help ensure the effectiveness of diversion intakes, including monitoring and coordination activities among water users and modifying intakes. Drinking water suppliers are strongly encouraged to implement these actions. The proposed Plan amendments do not include any State Water Board action that would require them to do so. Therefore, unless and until these mitigation measures are implemented, the impact remains potentially significant.

Impact UT-f: Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs

Impact UT-g: Comply with federal, state, and local statutes and regulations related to solid waste

The analysis of landfill capacity and compliance with solid waste regulations are closely related and therefore are combined and addressed together under Impact UT-f and UT-g.

Changes in hydrology under the proposed Plan amendments would not generate solid waste and would not contribute to landfills. There are no federal, state, or local statutes or regulations related to solid waste that are applicable to changes in flows and reservoir levels.

Changes to agricultural crop type or production resulting from changes in water supply could generate solid waste. If reduced irrigation water supply leads to the conversion of orchards to other crop types, the trees would be removed from the field and may be turned into wood chips, which may be used as mulch or compost or disposed of in a landfill. However, it is unlikely that agricultural land use changes would happen at such a scale that additional landfill capacity would be required. The proposed Plan amendments would present no obstacle to agricultural producer's continued operation in compliance with federal, state, and local regulations related to solid waste. The impact would be less than significant.

Changes in water supply that would result in reduced water supplies to municipalities, or the use of other water supplies (i.e., changes to groundwater management practices, water transfers) would not generate solid waste and would not contribute to landfills. There are no federal, state, or local statutes or regulations related to solid waste that are applicable to these changes in water supply.

Increased water recycling may lead to an increase in the solid waste byproducts, which are often disposed of in landfills. However, it is unlikely that the increase in solid waste would be significant enough to require additional landfill capacity. The disposal of this waste would comply with federal, state, and local regulations related to solid waste. The impact would be less than significant.

7.20.4 Mitigation Measures

MM-UT-a: Avoid or reduce potential to exceed wastewater treatment requirements

1. **Water Quality Contaminants and Regulation of Waste Discharges:**

    i. The State Water Board and regional water boards will continue regulation of waste discharges from WWTPs under individual NPDES and WDR permitting.

   ii. The State Water Board will continue to implement funding programs that provide loans and grants for capital improvements to WWTPs.

2. **Protect Municipal Water Quality:**

   i. The State Water Board and its DDW will continue to require public water systems to comply with regulations to implement the Safe Drinking Water Act, including applicable permit conditions. DDW will also continue to inspect water systems, track and monitor for compliance, and take appropriate enforcement action if needed.

   ii. The State Water Board will continue to implement funding programs for various types of assistance projects that (1) provide interim access to safe water sources; (2) contract or provide a grant to an administrator to address or prevent failure to provide safe and affordable drinking water; (3) improve water delivery infrastructure; (4) provide technical assistance to disadvantaged communities; (5) consolidate systems; and (6) fund operation and maintenance for disadvantaged and low-income communities.

   iii. Service providers should modify water treatment procedures or mix water sources to retain adequate drinking water quality and to comply with their drinking water permits.

3. **Increased Coordination between Water Suppliers and Wastewater Agencies:** Municipal water suppliers should communicate with agencies that provide wastewater service in their areas about water demand management strategies being planned or implemented, including projected indoor water conservation and the anticipated changes in wastewater influent volume and water quality that could result from implementation. This would help wastewater agencies become better prepared for short- and long-term changes in WWTP influent characteristics. DWR and the State Water Board should help facilitate better exchange of information and provide guidance for integrating water supply and wastewater planning. This facilitation would include development of measures in water conservation regulations that would ensure coordination among drinking water and wastewater agencies. The State Water Board will also require coordination among drinking water and wastewater agencies as part of the funding approval process for public water system improvements.

4. **Minimize Surface Water Quality Effects on Wastewater Treatment Plants:** Implement Mitigation Measure MM-SW-a,f to avoid or reduce violations of water quality standards or waste discharge requirements, and/or degradation of water quality.

5. **Minimize Groundwater Quality Effects on Wastewater Treatment Plants:** Implement Mitigation Measure MM-GW-a,f to avoid or minimize impacts on groundwater quality from depletion of groundwater supplies or substantial interference with groundwater recharge.

MM-UT-b: Avoid or reduce impacts from the construction of new water or wastewater treatment facilities or expansion of existing facilities

1. Implement MM-UT-a to avoid or reduce potential for exceedances of WWTP requirements.

2. If construction of new water or wastewater treatment facilities or expansion of existing facilities is necessary, implementation of mitigation measures described in Section 7.22, *New or Modified Facilities*, will reduce or avoid construction-related impacts.

MM-UT-d: Avoid or reduce impacts on municipal supplies

1. **Voluntary Implementation Plans:** The proposed program of implementation promotes voluntary implementation plans that could amplify the ecological benefit of new and existing flows with physical habitat restoration and other complementary ecosystem measures and that may also reduce the volume of water that needs to be dedicated for instream purposes, resulting in less water supply reductions for municipal use. Water users are encouraged to work together to tailor approaches to meet the proposed Plan amendments in a manner that minimizes disruptions to consumptive uses.

2. **Diversify Water Portfolios:** Water users can and should diversify their water supply portfolios to the extent possible, in an environmentally responsible manner and in accordance with the law. This includes sustainable conjunctive use of groundwater and surface water, water transfers, water conservation and efficiency upgrades, and increased use of recycled water.

   i. **Groundwater Storage and Recovery:** The State Water Board will continue efforts to encourage and promote environmentally sound recharge projects that use surplus surface water, including prioritizing the processing of temporary and long-term water right permits for projects that enhance the ability of a local or state agency to capture high runoff events for local storage or recharge.

   ii. **Recycled Water:** The State Water Board will continue efforts to encourage and promote recycled water projects, including projects that involve use of recycled water for groundwater recharge, through expediting permit processes and funding efforts.

   iii. **Water Conservation:** While water conservation does not generate new water, it can extend the utility of existing supplies and mitigate impacts from reduced deliveries of Sacramento/Delta supply for municipal use. Municipal suppliers have an obligation to continue implementing UWMPs that include water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies, and to update such plans every 5 years. There are a number of demand reduction measures to address shortage levels, including public education and outreach campaigns, watering and other outdoor use restrictions, and rate structure changes. Other demand reduction actions, such as infrastructure improvements or installation of water-efficient appliances and fixtures would be implemented over a longer-term. Municipal suppliers can and should implement measures to increased water use efficiency and associated energy conservation, including but not limited to, demand management measures; plumbing codes requiring more efficient fixtures; the Model Water Efficient Landscape Ordinance; advances in irrigation technology; new technologies in the commercial, institutional, and industrial sectors; and mandates requiring that unmetered connections become metered.

3. **Increase Water Use Efficiency:** The State Water Board will continue to pursue various efforts that increase water use efficiency and conservation to maximize the beneficial use of Sacramento/Delta supply. The following water efficiency measures will reduce water use.

   i. All municipal water suppliers and agricultural water users have an obligation to maximize water use efficiency and utilize conservation to the extent possible in conformance with the prohibition against waste and unreasonable use in the California Constitution. As directed by the Governor’s Executive Order B-40-17 (April 7, 2017), the State Water Board is currently conducting a rulemaking process to prohibit wasteful water use practices. In addition, the State Water Board may implement the prohibition on waste and unreasonable use in exercising its discretionary authorities in its water right and water quality decision-making processes.

ii. The State Water Board, DWR, Public Utilities Commission, Department of Food and Agriculture and Energy Commission will continue to implement their April 2017 response plan to the Governor's Executive Orders B-37-16 (May 9, 2016) and B-40-17 (April 7, 2017). The response plan includes recommendations and an implementation timeline to (1) use water more wisely (including adoption of municipal retail water use efficiency standards and methods for quantifying water use objectives); (2) eliminate water waste; (3) strengthen local drought resistance; and (4) improve agricultural water use efficiency and drought planning.

iii. Conservation a California Way of Life: In 2018, the California State Legislature passed Assembly Bill 1668 and Senate Bill 606 that build on ongoing efforts to make water conservation a way of life in California and create a new foundation for long-term improvements in water. DWR and the State Water Board developed *Making Conservation a California Way of Life – Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)*, outlining key authorities, requirements, timeline, roles, and responsibilities of state agencies, water suppliers, and other entities during implementation of actions described in the 2018 legislation. The State Water Board is developing the proposed regulation to implement the Making Conservation a California Way of Life framework. The formal rulemaking process is expected to begin (in May 2023). The State Water Board will continue to pursue the development of programs that increase water use efficiency and conservation in order to maximize the beneficial use of Sacramento/Delta supplies.

iv. The State Water Board will implement within loan and grant programs for water use projects a requirement to include water use efficiency plans to help achieve mandated water conservation targets as one of the conditions of funding approval.

4. **Implement Municipal Water Shortage Policy:** The proposed program of implementation prioritizes minimum health and safety water supplies in its implementation efforts and provides for a possible minor exception to the strict rule of water right priority for these supplies in cases where no other options are available to ensure that minimum health and safety needs are met. The Executive Director could approve temporary modifications in the required contributions from municipal suppliers (and others to the extent necessary for public health and safety purposes) in the event of a declared drought emergency by the Governor or other declared emergency after opportunity for public comment. To request such a modification, water users would need to make a showing that they were maximizing water use efficiency efforts, alternative supplies had been pursued and were not available, long-term drought and public health and safety planning measures were in place and being adhered to, and there would not be unreasonable impacts on fish and wildlife. Such requests would need to be accompanied by proposed alternate responsibilities and the basis for those provisions.

   The proposed program of implementation includes provisions for certain limited instances where additional time is needed to provide for minimum health and safety water supplies before some water users fully implement measures to meet their responsibilities for complying with the objectives. Specifically, after the opportunity for public comment, the proposed program of implementation would allow the State Water Board to extend the time limits by up to 5 years for municipal suppliers (and possibly others that provide water for health and safety purposes) to implement their responsibilities for complying with the objectives, to allow water users time to develop long-term measures to provide for meeting minimum health and safety water supplies while meeting their responsibilities for contributing to the objectives. A period of up to 10 years could be provided in extreme circumstances in which full implementation could result in reductions of supplies to municipal users below 55 gallons per person per day or similar public health and safety concerns. To request such modifications, water users would need to make the showings specified above for the short-term modifications and propose a time schedule for incremental implementation, including appropriate support for such proposal. Future updates to UWMPs should include consideration of the implemented water shortage policy.

5. **Prioritize Water Supplies for Health and Safety:** Entities that are already implementing local water shortage policies should prioritize water supplies for health and safety, if not already doing so.

6. **Reduce Impacts on Groundwater**: Implement Mitigation Measure MM-GW-b to reduce impacts of lower groundwater levels and associated impacts from increased municipal use of groundwater.

7. **Protect Municipal Water Supplies**: Implement MM-UT-a to protect municipal use and water quality.

8. **Ensure Effectiveness of Diversion Intakes**: Implementation of Mitigation Measure MM-AG-a,e:7 will reduce potential impacts of lowered stream flow and lowered reservoir levels on the effectiveness of diversion intake operations.

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